

THE AUTOMOBILE

WEEKLY

NEW YORK—THURSDAY, JULY 2, 1908—CH. 30

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LONG FOCUS MIRRORS

are very good as far as they go; that is they are far away from the flame, and are less liable to break from defective or clogged burners.

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are also excellent in that they collect more light rays than a long focus.

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combine all the good points of the above, and are designed especially for use on an automobile, to be used with an acetylene gas flame. They are composed of scientific curves to reflect every ray of light, and also designed to overcome the small dark ring of the acetylene flame, so no shadows are cast, and that is the reason why we get 30 PER CENT. MORE CANDLE-POWER (from tests at one of the largest institutes in the country) than our nearest competitor, and that is one of the many reasons why such concerns as Winton, Peerless, Force, Elmore, Stoddard-Dayton, Reo, Pennsylvania, Rainier, Pope-Hartford, Premier, Dorris, Garford and Jackson, use them.

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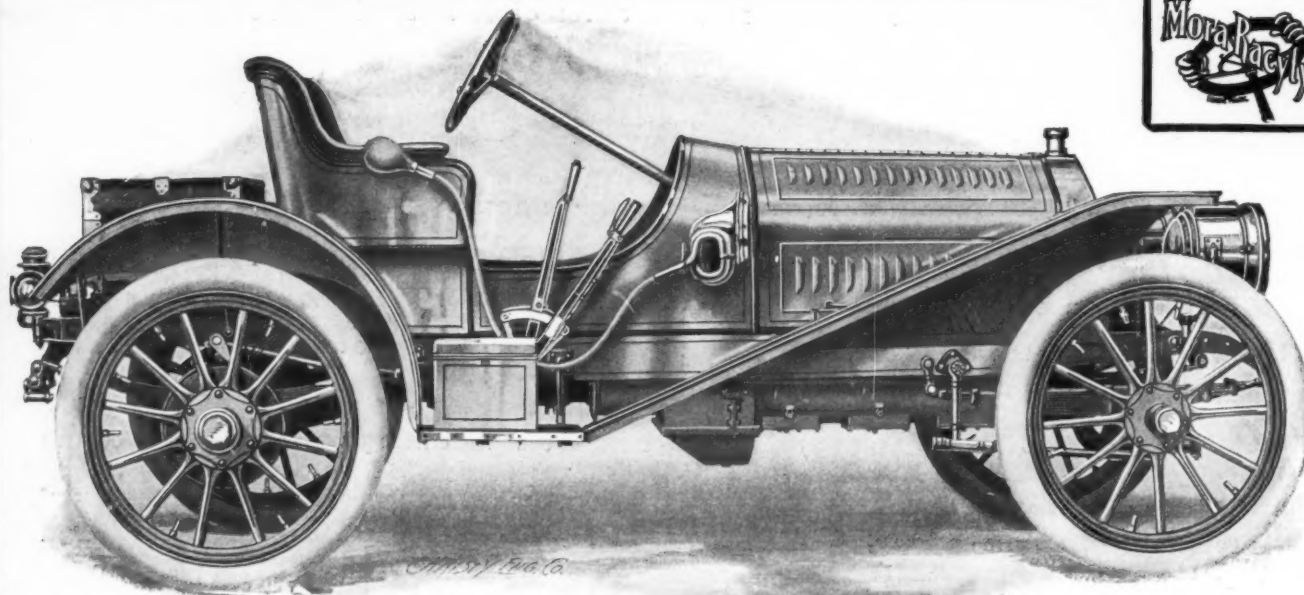
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THE AUTOMOBILE

Engineers Meet at America's Automobile Center



Engineers Looking Pleasant at the Fine New Plant of the Chalmers-Detroit Company.

DETROIT, June 27.—With the conclusion of the luncheon tendered the visiting technical men by Messrs. Russell and Rumney, of the Detroit Steel Products Company, at the Detroit Boat Club on Belle Isle, and the technical session and business meeting which followed it, there came to an end the most successful gathering that the Society of Automobile Engineers has ever had in its existence of three years. It was the Third Annual summer meeting and was scheduled for Thursday, Friday, and Saturday of this week, but the widespread interest manifested in the occasion became evident very early as the automobile builders and designers, as well as their technical confrères in the accessory field, began to drop in at the Hotel Tuller headquarters on Wednesday afternoon, and as shown by the Society register, there were representatives from Coast to Coast, arrivals from Boston and Los Angeles coming in close proximity, while practically every important automobile manufacturing center east of the Mississippi contributed its quota of talent.

As the result of the untiring efforts of H. E. Coffin, chairman of the Detroit entertainment committee, and his co-workers, James H. Herron, Russell Huff, Henry Ford, and Alanson P. Brush, everything was in complete readiness for the visiting engineers. Owing to the most cordial invitation of the American Society of Mechanical Engineers to participate in all and any of the numerous entertainments provided by the local com-

mittee of that body and extended to the automobile engineers by President Holman and Secretary Rice of the A. S. M. E., it was impossible to definitely outline the entire program in advance. After conferring with Messrs. Coffin, Herron and Huff, of the local committee, it was decided to schedule the papers by E. S. Foljambe on "Autogenous Welding in Automobile Construction," and by Otto Heins on "Some Recent Developments in Magneto Ignition with Special Reference to the Bosch System," for Thursday night instead of devoting an entire evening to each, in order to be able to take advantage of the very kind invitation of the Mechanical Engineers to take part in their excursion to Bois Blanc island, at the mouth of the Detroit river, on Friday afternoon.

The first thing on the program Thursday morning was attendance at the launching of the huge lake freighter, Daniel B. Meachem, the invitation of the Great Lakes Engineering Works to the Mechanical Engineers having been extended by the latter to the automobile fraternity. The steamer "Britannia" left the Third street dock, loaded to the rails, and proceeded down the river to the shipbuilding plant. The 10,500-ton cargo carrier was slid off the ways laterally and plunged into her native element with what was scarcely a ripple, considering her huge bulk, though some of the engineers and their ladies whose curiosity led them too near found the wavelet real moist when it caught them unawares.



Thomas-Detroits Which Took Visitors to Grosse Point.

The automobile contingent was met at the dock on the return of the "Britannia" by a number of cars kindly tendered for the occasion by the Thomas, now the Chalmers, and the Packard factories, and were taken out to Dobson's, where one of the typical frog-leg and chicken dinners for which Detroit is so justly famous was served at the invitation of the Society. Following this, the members were treated to a view of the long line of beautiful residences that front on Lake St. Clair. The ladies of the auto engineers' party were then left at the Detroit Country Club for afternoon tea with the ladies of the A. S. M. E., at the invitation of Mrs. Dow, head of the ladies' entertainment committee, the engineers themselves proceeding to the Thomas plant, where they were welcomed by Mr. Coffin and his right hand man, J. G. Utz, and R. G. Chapin, treasurer of the company.

Naturally, the chief object of interest was Mr. Coffin's new production, the Chalmers-New-Detroit, upon which he and Mr. Utz have been working for a year or two past, one of the cars having been on the road since last October, but which has been kept so very quiet that none outside of the shop had the faintest inkling of the new and startling development until its creators were ready to take the lid off, for the car that had been on the road all that time was most effectively disguised with a huge body and tool box.

Expressions of surprise and admiration at the many ingenious and novel features incorporated in the car by Mr. Coffin, such as its block motor, integral manifolds, with power plant and transmission on three-point suspension, single pedal clutch and brake control, were universal. The light and airy buildings of the new Chalmers plant with their high ceilings, white walls, and immense stretches of glass, also came in for unstinted approval, while the many kinks of shop practice introduced by Mr. Coffin and his assistants to facilitate manufacturing, and particularly



On the "Britannia" at the invitation of the A. S. M. E.

the assembling of the cars, brought forth much commendation. After looking pleasant for the ubiquitous man behind the camera, Mr. Benham—and who could not look pleasant in Detroit, where as expressed by the motto on the reverse of the souvenir fobs presented by the local committee, "Life is worth living"—the engineers were whisked across town to the Ford plant.

The men who design and build cars and their parts had already been treated to more than one surprise, but here indeed was a genuine eye-opener that made every optic literally bulge. The very atmosphere of the plant seemed to spawn Ford runabouts and roadsters—they were here, there, and everywhere, wherever one looked he saw Fords, not in ones and twos, but in flocks. Under the kind guidance of Mr. Wills, the factory superintendent and technical head of the plant, the engineers were treated to a comprehensive view of the system that makes a Ford "every six minutes of every working day," a possibility. But it was not in the ingenuity displayed in the numerous methods of machining and assembling the eighty odd cars that constituted a day's output, that drew open-mouthed admiration, as it was the spirit of the workmen. "Man alive, they actually

run and jump to grab the pieces to put them together," remarked one of the experienced visiting designers to a confrère. Wherever one looked, the men were finishing parts and building Ford cars from the ground up, as if their very existence depended upon finishing the task in hand. But when they came to the next job, it was the same story of high pressure and sustained tension. "Every man in the place must be on piece work," was the opinion voiced by an old hand in shop practice and management, but a request for enlightenment on the subject made later to James Couzens, treasurer of the Ford Company, proved this not to be the case. "It's the Ford spirit," said Mr. Couzens, and the men who had seen its working realized for the first time that it was the intangible thing that the Frenchmen have so aptly termed *esprit de corps* that made possible the manufacture of more than 17,000 cars in less than two years.

"We're practically cleaning up this series now," remarked Mr. Wills to an inquiry. "But what are these endless stacks of finished motor units that cover every part of the floor?" asked the questioner. "Oh, those will all be out of here in six weeks or so," said the Ford engineer, adding in a most nonchalant way, "We have only about 2,000 cars left to build." The shutdown whistle for the day found the visiting engineers in the testing room of the plant where two long rows of motors running at full speed made conversation utterly impossible. This was practically the only department in which the long-drawn-out blast of the whistle caused the men to hustle for the wash basin, but anyone who had been testing Ford motors all day was entitled to the privilege. In the other departments, many kept right on working until the rush to wash was through.

In the evening, the first paper scheduled was that on autogenous welding, but owing to some delay in setting up the apparatus for the demonstration, which had been kindly supplied by the Davis-Bournonville Acetylene Development Company of New York, and the Linde Air Products Company of Buffalo, the



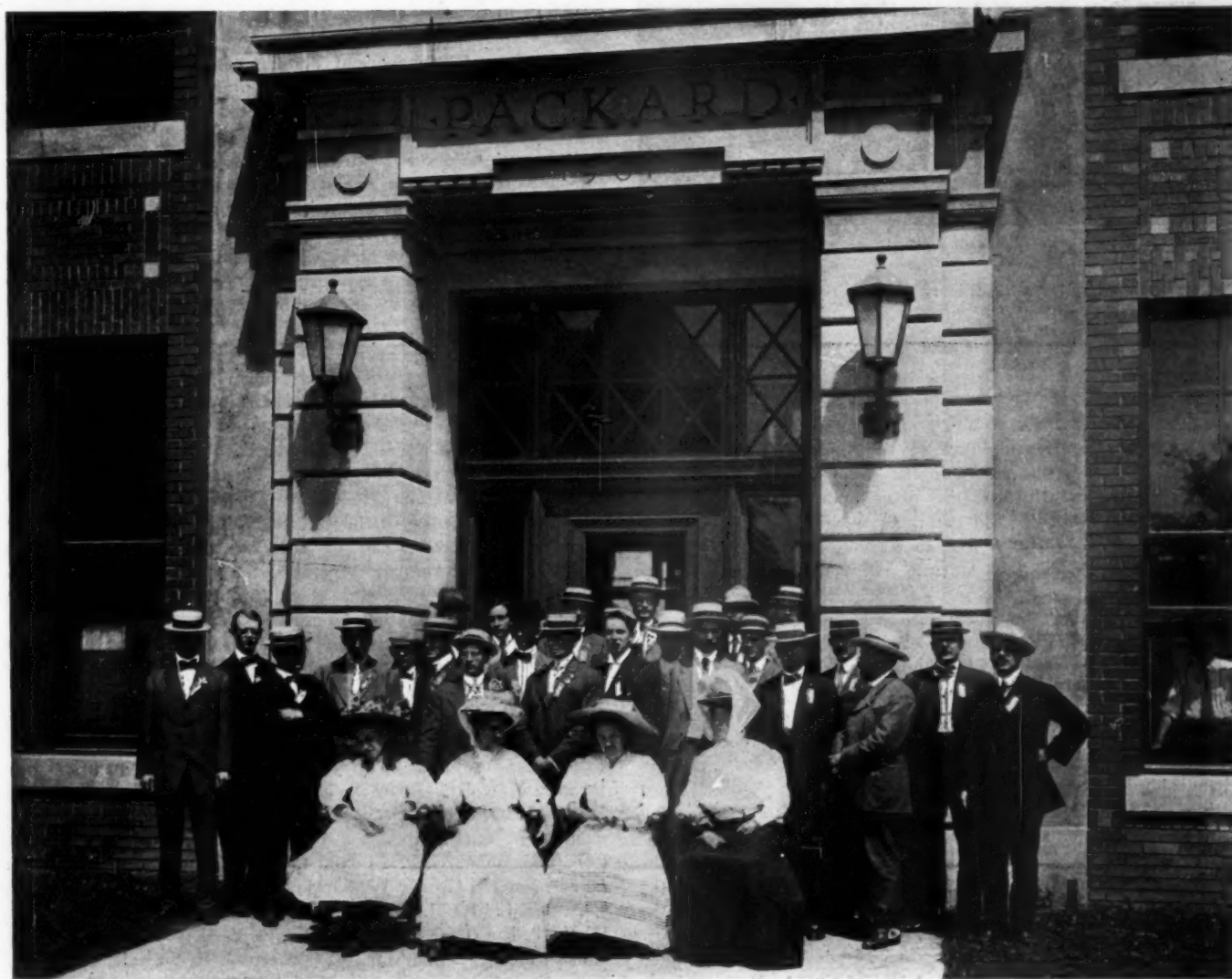
President Fay and Manager Newman Confer.

paper on "The Storage Battery in Automobile Work," by Bruce Ford, was read and discussed at some length. Mr. Foljambe then gave a brief résumé of his paper on autogenous welding, describing in a few words the apparatus necessary and the method of employing it for both welding and cutting, outlining in addition a few of the many possibilities that this process holds for the automobile builder, such as welding frames and other parts where the original construction of the car is concerned, beside its extremely widespread adaptability to the repairing of broken parts on the car, particularly aluminum and iron castings, as it is easily possible to weld any two or more dissimilar metals, the strength of the joint approximating very closely to that of the original piece before breaking.

Several drop-forged pieces, such as a connecting-rod, which had been cut in half for the purpose, were then quickly put together by Mr. Brunning, a representative of the Linde Air Products Company, the time required not exceeding two or three minutes, even with the meager facilities at hand for holding the work, although in the case of the drop-forged connecting-rod, the remarkable localization of the heat was manifested by the fact that in this eight or nine-inch piece of metal it had not extended sufficiently far from the weld to make it unbearable to the naked hand at the ends and it was possible to pick up the piece without discomfort. A large motor cylinder which had been supplied by Mr. Northway, a member of the Society, for the purpose, was then made good by welding up a four-inch cut that had been made in its water-jacket, strikingly demonstrating the value of the process for repairing castings. But for the

possibility of sealing the gap in question in this manner, this cylinder would have been a waster if new, or would have required a replacement, had it broken in this manner in service, but it was made good in less than five minutes, although it is customary on a piece of such size to preheat the whole cylinder in order to avoid setting up internal strains in the metal. Then came the crucial test of the process for one branch of work—that of cutting metals. Mr. Herron, of the local committee, had furnished a slab of 60-point carbon steel a foot or more in length, four inches wide and 1 5/8 inches thick. The object of the demonstration was to show how readily a crankshaft form could be cut from the solid slab and to facilitate turning at the corners, holes had been drilled at those spots. The makeshift nature of the apparatus employed for the test may be appreciated when it is stated that a Prest-O-Lite tank was impressed into service to furnish the acetylene gas. Less than ten minutes were required to cut the top and one side of the crank outline and the efficiency of the process for the purpose having been satisfactorily shown, the demonstration was halted and the subject laid open for discussion. Owing to the extremely wide range of questions that could be brought up, it was decided to request written discussions from the members. A number of the A. S. M. E. members attended this session, the meetings of both societies having been thrown open to the members of both the visiting organizations.

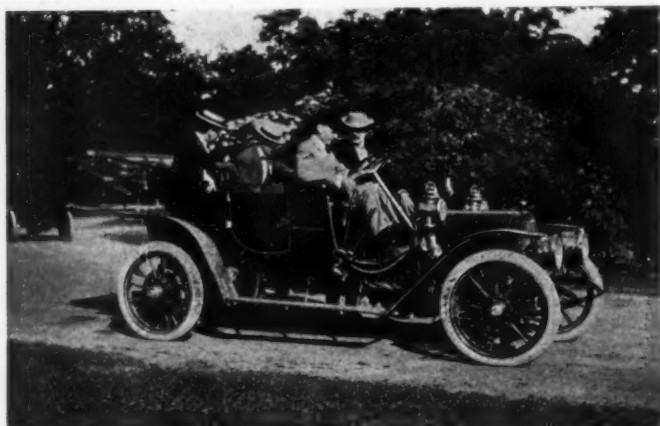
Mr. Heins then read a paper on the subject of "Recent Developments in Magneto Ignition," which was profusely illustrated by lantern slides showing various phases of the develop-



Facing the Camera in Front of the Administration Building of the Fine Plant Where Packards Are Built.

ment of the ignition of the internal combustion motor since the earliest days, then taking up the magneto itself and showing the course of its development in the last eight or ten years to its present high state of perfection. He also compared the efficiency of the coil system of ignition with that of the magneto, as well as that of different types of magnetos, each point being graphically brought out by the use of lantern slides. Mr. Heins' paper also covered such a wide range that it was difficult to discuss it at any length in the time available, and written discussions were accordingly requested. A more detailed report of Mr. Heins' lecture will be found in connection with the transcript of his paper which appears in this issue of THE AUTOMOBILE.

Friday morning, the automobile engineers attended the meeting of the American Society of Mechanical Engineers at the request of the latter, in order to participate in the continued discussion of the paper by Henry Souther on "Clutches." In the absence of Mr. Souther, Secretary Hayward of the S. A. E. was called upon to lead the discussion, consisting of a brief outline of the points brought out by Mr. Souther in his paper. President Fay was then requested to enlighten the mechanical engineers as to some points of automobile clutch design, which he did by calling attention to some of the essential points of the



Chairman Coffin at the Wheel of the Chalmers-New-Detroit.

good clutch as developed during the past several years of experience on the automobile.

Cadillac Plant Came in for Inspection.

Immediately upon the conclusion of this session, the automobile engineers were carried in a string of Cadillac cars to visit the plant where the latter are built. This was done at the special invitation of Mr. Leland, head of the Cadillac company, and, realizing that the time available for the visit was limited, the visitors were sent through the plant under the guidance of Messrs. Sweet, Johnson and the other members of the Cadillac technical staff in groups of five, each group making a systematic tour of the whole plant by starting out in a different direction. To the engineer, the most impressive feature of the whole Cadillac plant is its thoroughly worked-out system of manufacturing every part of the car. Although cars were being turned out in large numbers, everything was going along in the most orderly manner, and there were no symptoms of unusual bustle or hurry. But more than this was the striving after the greatest possible accuracy wherever needed that was manifest in the construction of every part so that a Cadillac could be said to be interchangeable in every respect without the necessity of the slightest fitting or alteration, and probably there are few plants that have carried systematic accuracy to the same extent as in the case of the builders of the Cadillac. After having stood for the camera man again, the engineers were whisked over to the Cadillac foundry and their visit was opportunely timed, as the pouring was just under way.

From the Cadillac plant, the automobile designers were taken in the cars to the foot of Bates street, where the steamer *Britannia* was again boarded at the invitation of the local committee

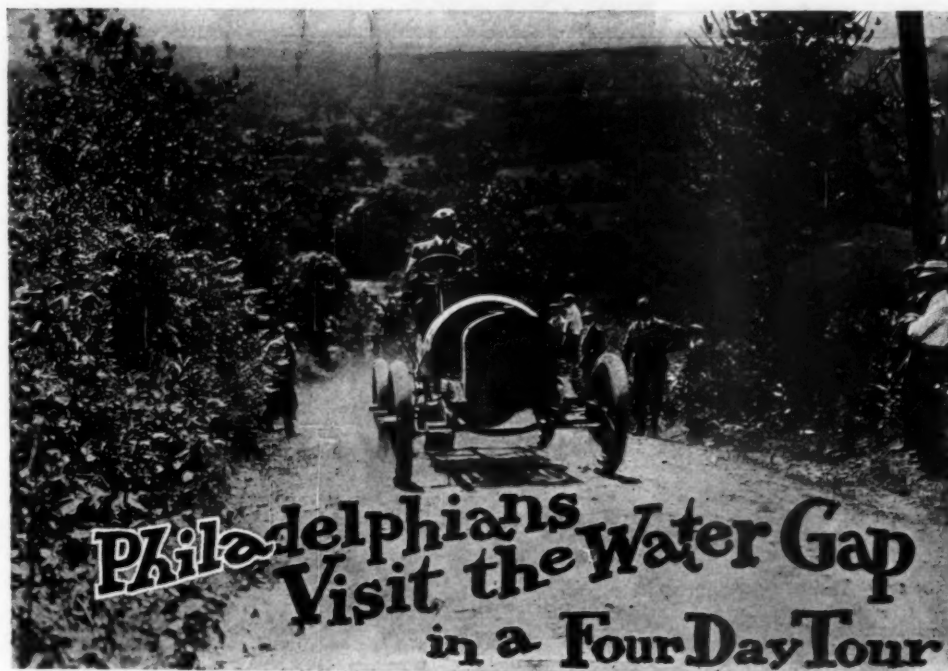
of the A. S. M. E., headed by Mr. Dow, for a run down the river to "Baa Blow" (Bois Blanc) island, where dinner was served in the casino, the steamer bringing the party back about 10 P.M., after the end of the second strenuous day. The next morning, the new plant of the Detroit Steel Products Company was visited in a number of Packard cars and the ubiquitous Woods electric of Newman, who always managed to find his way round town on time, and from the Steel company's plant the cars were again taken for the last factory visit of the meeting, that to the Packard plant. The latter now covers some 12 acres of floor space and is reputed to have no less than 18 miles of rooms in its numerous large buildings, so that the visit was confined to the most interesting departments of the huge factory. A start was made in the testing laboratory, in charge of Daniel Huff, brother of the Packard company's chief engineer, and the action of the 200,000-pound testing machine was shown for the benefit of the visitors on a piece of strap-iron of 1-4-inch thickness. After a trip through the beautifully fitted administration building, the visitors were then conducted through the numerous manufacturing departments and shown the various processes in the building of Packard touring cars and trucks, the running and testing departments coming in for particular attention at the hands of the sharps owing to the extreme thoroughness with which the Packard system of inspection is carried out there. In addition to the Messrs. Huff, who acted as guides, Ralph Estep, the Packard publicity man, and Allen Loomis, one of Mr. Huff's staff, aided by other assistants from the engineering force, piloted the engineers through the plant so that every department of interest was covered by the time the shut-down whistle sounded at 11:30.

Final Session Held on Belle Isle.

A number of Packard and Thomas cars were then impressed for a drive round Belle Isle, ending up an hour later at the Detroit Boat club for the lunch tendered the Society by J. G. Rumney of the Detroit Steel Products Company. The occasion was a most enjoyable one, and Mr. Russell, president of the same company, felicitated the engineers on their visit to Detroit, getting off numerous quips at the expense of those whom he knew personally. The lunch was followed by a business session, at which it was decided to make Cleveland the next place of meeting, the date to be between September 20 and October 10, the exact days to be set by the committee on meetings in conference with the council.

In the absence of Frank Beemer abroad, his paper on the "Unit System of Power Transmission in Automobiles" was read by Secretary Hayward, the brief abstract given of the principal points of Mr. Beemer's arguments for the transmission axle leading to an interesting discussion during which numerous points of value were brought out. This was followed by A. L. Dixon's paper on the "Increased Efficiency of Single Motor Drive," which, owing to the fact that it consisted principally of tabulated data, was read by title, written discussions being promised on both this and several of the phases of Mr. Beemer's subject. The meeting was then adjourned to reconvene in Cleveland three months later, the dates falling somewhat in the fortnight consisting of the last week in September and the first week of October, this being decided by the council and committee on meetings.

Among those present were: Thomas J. Fay, H. M. Swetland, J. W. Cain, R. E. Northway, James H. Herron, J. Wilson Drown, Ernest L. Smith, E. S. Foljambe, John H. Thompson, H. M. Jerome, Marcel de Jarny, George McLean, Russell Huff, Daniel Huff, Allen Loomis, Bruce Ford, H. Vanderbeek, H. K. Holzman, H. B. MacFarland, J. O. Heinze, B. G. Ellis, G. L. Chandler, Robert C. Shoel, G. E. Franquist, F. J. Newman, P. H. Shearer, E. F. Schnuck, George W. Sargent, W. G. Wall, G. B. Norcross, J. A. McMichael, J. W. Bate, Otto Heins, M. H. Ferrell, F. E. Watts, L. Charles Kenen, W. S. Noyes, C. H. Westen, P. J. Brennan, Francis S. Thompson, V. Oldberg, J. E. DuBois, George L. Fish, Courtland D. Cramp, Marius C. Krarup and Charles B. Hayward, Secretary of the Society.



Philadelphians Visit the Water Gap in a Four Day Tour

The Rambler That Was a Three-time Winner During the Tour.

STROUDSBURG, PA., June 30.—While last week's first annual carnival of the Monroe County Automobile Club was not exactly a howling success, it demonstrated the possibilities of such an affair as a medium for attracting automobile visitors to this charming mountain section.

"Jack" Hiscock, the Philadelphia newspaper man who boomed the affair, labored diligently, and but for his efforts the whole thing might have fallen through. Those who took part in the carnival, however, are delighted with their experience—as well they might be, for they were treated like princes.

Story of the First Day's Run.

STROUDSBURG, PA., June 24.—To-day's double header endurance run from New York and Philadelphia to this place was disappointingly meager to the management of the affair. Less than a dozen cars came from the Quaker City, and none at all from Gotham. THE AUTOMOBILE representative had a seat in the Studebaker Navy Dispatch car, driven by Frank Yerger.

A heavy thunderstorm delayed some of the rear cars, several trees having been blown down across the road between Easton and Delaware Water Gap. The length of the route on which the committee set a time limit of 4 hours 24 minutes was 88 miles, and was laid out via Willow Grove, Doylestown, Easton, Portland and the Gap to Stroudsburg. Following is a summary:

CLASS A.

		Penalties	Cause of Tech.
		Road Tech.	Total Penalization.
8. Elmore	30-35	Hardart ..0	0 0
6. Mitchell	35	Cram	0 5 5 Leaky Radi-
10. Thomas	60	Magraw ..10	0 10 ator.
*4. Studebaker	30	Yerger ..12	0 12

*Yerger entered protest against his penalty of 12 points, having been illegally held up 15 minutes in Doylestown by the local police, and afterwards released with an apology.

CLASS B.

2. Thomas-Detroit ..	40	Stetson ...0	0 0
7. Autocar	24	Brown	2 2 Smashed uni-
13. Packard	30	Simonin 194	0 194 versal joint

CLASS C.

3. Ford	15	White	0 0
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Second Day Was the Hill-climb.

STROUDSBURG, PA., June 25.—The paucity of entries spoiled the hill-climb at the Water Gap to-day. The program was completed in something less than an hour. The scene of the climb which is called Gulick Hill, is a cross-road connecting the Cherry Valley and Foxtown roads. It is a trifle over 5,000 feet long, and the first 300 yards are the most difficult of the course—

with a grade closely approaching 20 per cent. running straight up.

The start was from in front of the "Cherry Creek Farm," an ancient hostelry which has acquired fame (since the climb) for its hard cider and ice-cold spring water. The platform on which the officials were perched at the finish fairly overhung the deep valley, the view across which to the Delaware Water Gap elicited complimentary adjectives as to the artistic instincts of the promoters.

The feature of the day, which was to have been the upward flight of Levey's 120-horsepower Hotchkiss in the free-for all, came as near as a hair to being a tragedy, but, fortunately, "Jud" Kilpatrick, its driver, had his noddle with him, and when he swung to the outside on the last sharp turn and dashed into an upright of the stout fence erected as a protection to travelers at that point, he shut off his engine and managed to stop the car, without injury either to himself or to his mechanician,

Stephen Carusso, although the latter was catapulted about 20 feet ahead of the car when it struck. The only visible injury to the flyer was the bending of the left end of the front axle, the top of the wheel standing out at an angle of 45 degrees as the Hotchkiss hobbled painfully past the finish on her way to the hospital in Stroudsburg.

The mishap to the Hotchkiss gave a walkover victory for the free-for-all honors to the Zust "40," driven by Jules Berigne, which negotiated the hill in 1:57.

Strange to say, the free-for-all winner's time was badly beaten in the \$1,251 to \$2,000 gasoline event, when the stripped Rambler "24," owned and driven by W. H. Pierce, made the trip in 1:46 2-5, the runner up, Bert Clark's 65-horsepower Jackson also beating the Zust's time by an even five seconds.

Jules Berigne's Zust "40" also had a walkover in the \$4,001-and-over class, with a voyage in 2:04. The summary:

GASOLINE STOCK CARS, \$851 TO \$1,250.

36. Buick	22	H. D. Church	2:13 2-5
37. Jackson	24	J. A. Rutan	2:20

GASOLINE STOCK CARS, \$1,251 TO \$2,000.

39. Rambler	35	W. H. Pierce	1:46 2-5
38. Jackson	35	Bert Clark	1:52

STEAM OR GASOLINE STOCK CARS, \$2,001 TO \$3,000.

4. Studebaker	30	Frank Yerger	2:23 2-5
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Where the Officials Were Located on Pocono's Summit.



The Pennsylvania That Won in the Third Day's Event.

GASOLINE STOCK CARS, \$4,001 AND OVER.

47. Zust40 Jules Berigne2:04

FREE-FOR-ALL.

47. Zust40 Jules Berigne1:57
42. Hotchkiss120 J. Kilpatrick....Damaged in collision.

Third Day Brought Out the Speeders.

STROUDSBURG, PA., June 26.—The scene shifted to-day to Pocono summit, where a fair mile straightaway had been laid out. The course was rolling, however, and the star card, Levey's Hotchkiss, was unable to show its best paces. Kilpatrick drove the big smoke to the course record of :48 3-5, the only other car to get under the minute being the Pennsylvania "50," driven by J. Brown, which did :59 1-5 in the free-for-all, and captured another event in :58 3-5. The stripped Rambler, which made the fastest time in the Water Gap climb, again won in its class—15:1 to 24-horsepower gasoline cars—in 1:16 3-5, beating out the Buick and the Stevens-Duryea. Summary:

GASOLINE STOCK CARS, 15.1 to 24-H.P., INCLUSIVE.

39. Rambler24 W. H. Pierce1:16 3-5
36. Buick18 H. D. Church1:23
49. Stevens-Duryea J. Lee1:27

SPECIAL EVENT.

37. Jackson24 W. Smith1:16 1-5

FREE-FOR-ALL.

42. Hotchkiss120 J. Kilpatrick48 3-5
46. Pennsylvania50 J. Brown59 1-5
43. Thomas60 Harry Jones1:07 2-5
47. Zust40 Jules Berigne1:13

GASOLINE STOCK CARS, TOTAL PISTON AREA NOT EXCEEDING 103.87 SQUARE INCHES (BRIARCLIFF MODELS ELIGIBLE).

46. Pennsylvania50 J. Brown58 3-5
43. Thomas60 Harry Jones1:03 3-5

In the afternoon hill-climb for amateurs, which was held at Canadensis, five miles across the mountains from Pocono summit, the feature once more was the Hotchkiss, which in a special



Stevens-Duryea That Won Twice on the Third Day.



Kilpatrick Driving the Hotchkiss Up Old Pocono.

event arranged for that car and the Pennsylvania, beat out the latter by a good margin, its best time in three trials being :23 1-5 as against the Pennsy's :27 3-5. The event of the afternoon, the free-for-all, was a walkover for A. R. Allen's Thomas, time :32. The Thomas later did :30 flat. Summary:

SPECIAL EVENT FOR HILL RECORD.

42. Hotchkiss120 J. Kilpatrick... :24; :23 1-5; :23 2-5
46. Pennsylvania50 J. Brown..... :28; :27 3-5
43. Thomas60 Harry Jones.... :30

GASOLINE STOCK CARS, \$851 TO \$1,250.

37. Jackson35 J. A. Rutan42

GASOLINE STOCK CARS, \$1,251 TO \$2,000.

39. Rambler24 W. H. Pierce..... :34 2-5
38. Jackson35 B. Clark38 2-5

GASOLINE STOCK CARS, \$3,001 TO \$4,000.

50. Stevens-Duryea35 T. J. Kitson..... :34 2-5
44. Stevens-Duryea35 A. G. Scott34 3-5
51. Stevens-Duryea35 W. C. Snover40
52. Stevens-Duryea35 W. B. Easton.....41

FREE-FOR-ALL.

43. Thomas60 Harry Jones32

OPEN ONLY TO MEMBERS OF MONROE COUNTY AUTOMOBILE ASSOCIATION.

50. Stevens-Duryea35 T. J. Kitson34
36. Buick22 H. D. Church43 2-5
45. Maxwell28 W. B. Easton47 2-5

Fourth Day Was the Wind-up.

STROUDSBURG, PA., June 27.—The carnival rounded up this afternoon with a gymkhana on the half-mile track at the Monroe County Fair Grounds. Again the mighty Hotchkiss featured, Kilpatrick taking chances in driving his car to the track record of :35 3-5.

The driving a-mile-at-the-rate-of-ten-miles-an-hour event was won by J. D. Smith in a Jackson, H. R. Worthington, in a Benz, being the next best guesser, and D. H. Gaines, in a Zust, the third.



Elmore That Won the Cup in Class A on the Run.

HOW THE AUTOS CLIMBED SKIPPACK HILL

NORRISTOWN, PA., June 30.—That the "Willie" Haupt-Chadwick combination is the fastest thing in the hill-climbing line in this country if not in the world, was demonstrated last Saturday afternoon at the first annual hill-climb of the Norristown Automobile Club on Skippack Hill, a one and one-fifth mile, 3-to-10 per cent. grade, some five miles north of this town. Haupt twice cleaned up a big field by a big margin, and in his last trial he pushed his Great Chadwick "Six" to the limit and registered :57 2-5—a record which, by the way, he says he can better. A little figuring will show that this time represents a 75-mile-an-hour clip, and on the level stretch just beyond the finish he says his speedometer showed 80 miles. In his first official trial, in the gasoline free-for-all, he just missed getting under the minute—1:01, which is going some—up hill.



Haupt and His Record-breaking Chadwick.

There were three score trials at the hill, and the times made in all classes were very fast. While there was some little delay, due to the overcrowding of the course at the finish, the management of the whole affair reflects great credit on the hustling organization which promoted it. All hands worked like beavers, and, when the inadequate policing is taken into consideration, the promptness with which the program was run off was highly commendable. Fully 15,000 people lined the course, which had been oiled and was lightning fast.

The Chadwick had the same gearing as at Wilkes-Barre, but, whereas Haupt used his second (2.6) and third (3.9) speed there, here he relied entirely upon his high gear (1.9). All the events but the free-for-alls were from standing starts. In the big races the entrants went a couple of hundred yards up the hill on the other side of Skippack Creek to get a start, and the difference between the two styles was worth from 15 to 20 seconds.

The hill is 6,270 feet long, 352 feet high, and almost a straight-away, there being one slight bent about a third of a mile from the start. One bad feature of the course, however, is the trolley line which parallels it, the tracks crossing from one side to the other about midway of the hill. The cars of this line were in operation throughout the contest, but men with big red flags were on duty all the afternoon, and no hold-ups or accidents occurred. A liberal treatment of "Asphaltoilene" had laid the dust and rendered the going superb.

At the top of the hill, from which, by the way, seven counties may be seen, the grandstand and judges' stand were erected, on

the right ascending the hill. The timing system was something new in that line, having been invented by a Norristowner named Ballard. At start and finish a rubber hose filled with water was used instead of the usual tape. The pressure of the tires on the hose forced the water upward and effected an electrical contact which rang a bell both at start and finish. The bells were a trifle weak, however, and had to be listened for attentively by the timers in order to avoid a mistake. More current and louder bells would make the system a good one.

A half dozen State constabulary, one or two Norristown policemen and several club members armed with badges and sticks tried to keep the course clear, but it was not until the grandstand was thrown open to the public free of charge that they succeeded. That no accidents resulted was due in large measure to the officials, who, armed with megaphones, kept the crowd on the *qui vive* with their "car coming."

Aside from the overshadowing Chadwick performances, the hit of the day was made by the Knox "30," driven by William Bourgue. Although listed at \$2,600, it won the \$4,001-and-over class from such stalwarts as a pair of Apperson "55's" and two Stearns "60's," finished next to the Chadwick in the gasoline free-for-all, ahead of several cars costing twice as much, and captured fifth place in the big free-for-all. Earlier in the day, while competing in



Bourgue and His Knox That Won in Its Class.

its own (\$2,001 and \$3,000) class, Bourgue stopped before reaching the finish and returned and asked for another start. There was an immediate protest from all hands, but he was allowed to start, nevertheless, and made the best time in the class, 1:33 3-5. The officials, however, upheld the protest, and the Knox, having failed to reach the finish on its official trial, is credited with being "stalled," the race going to the Pennsylvania "50," with Zengle driving, in 1:36. The Pennsy also captured the \$3,001 to \$4,000 class in 1:38 2-5, just nosing out A. C. Miller and his Stoddard-Dayton by one-fifth of a second.

The Overland "24," driven by J. Brockway, won the \$851 to \$1,250 class in 2:11, but was beaten out by the Jackson "35," W. J. Hays, Jr., up, in the \$1,251 to \$2,000 gasoline class. The Jackson was the first car to get under the two-minute mark—1:53.

The first car to climb the hill in the gasoline free-for-all was Bourgue's Knox "30," and when the time, 1:15 4-5, was hung out, there were great expectations entertained of what the big fellows would do. But not one of them could get under the



Brockway's Overland Capturing the Second Event.

little Knox's figures until the Chadwick did the trick in 1:01. Even the mighty Matheson, the ponderous Pennsylvania, the sturdy Stearns and the active Apperson failed, while the less powerful cars seemed to be out of it entirely. There were many mutterings, head-shakings and inquisitive glances cast at the light gray flyer by the unsuccessful ones as it lay in the paddock waiting for the next event, but it played in second place to the Chadwick alone of all its opponents.

In the final free-for-all, however, after Bourgue's Knox had done 1:16 2-5, and the charging Chadwick had buried the hopes of all the others with its :57 2-5, Al. Dennison's Knox "48" got under its little brother's time with a 1:13 2-5 journey, and later Joe Parkin, Jr., drove his Parkin "60" to a 1:16 trip, which was duplicated a few minutes later by Harry Goodin in his "Sixty" Stearns. The summary, which includes a very representative list of cars, follows:

GASOLINE STOCK CARS, \$850 AND UNDER (STANDING START).

1. Buick	18	\$850	C. W. Mann.....	2:16 1-5
2. Ford	18	600	J. F. Graham.....	2:23
3. Ford	18	700	R. S. Heebner.....	2:35 3-5
4. Buick	18	850	J. K. Lewis.....	2:58
5. Buggy runabout	14	680	B. Applegate.....	3:40 1-5

GASOLINE STOCK CARS, \$851 TO \$1,250 (STANDING START).

1. Overland	24	\$1,250	J. Brockway	2:11
2. Buick	18	850	C. W. Mann.....	2:16 3-5
3. Mitchell	20	1,000	B. F. Stritzinger.....	2:31
4. Reo	20	1,025	H. Greenwood	2:38 1-5
5. Auburn	22	1,250	H. W. Trump	2:44

GASOLINE STOCK CARS, \$1,251 TO \$2,000 (STANDING START).

1. Jackson	35	\$2,000	W. J. Hays, Jr.....	1:53
2. Overland	24	1,250	J. Brockway	2:05 3-5
3. Oldsmobile	35	2,000	Tom Berger	2:15
4. Mitchell	35	2,000	B. F. Stritzinger	2:26

GASOLINE STOCK CARS, \$2,001 TO \$3,000 (STANDING START).

1. Pennsylvania	50	\$3,000	L. Zengle	1:36
2. Stoddard-Dayton	45	2,700	A. C. Miller	1:38 2-5
3. Jackson	35	2,000	W. J. Hays, Jr.....	1:41 2-5
4. Columbia	29	3,000	J. J. Coffey	1:46 1-5
5. Ford	40	2,800	L. C. Block	1:54
6. Crawford	50	3,000	T. M. Twining	2:05



Zengle in Pennsylvania That Won Two Events.

7. Acme	30	3,000	R. H. Morris.....	2:07 1-5
8. Crawford	40	3,000		2:47 1-5
9. Crawford	50	3,000	R. S. Crawford	3:57 3-5
10. Knox	30	2,600	W. Bourgue	*Stalled
11. Cadillac	30	2,500	J. E. Lee	Stalled

*Started again under protest and climbed the hill in 1:33 3-5, but protest was sustained.

GASOLINE STOCK CARS, \$3,001 TO \$4,000 (STANDING START).

1. Pennsylvania	50	\$3,000	L. Zengle.....	1:36 2-5
2. Stoddard-Dayton	45	2,700	A. C. Miller	1:38 3-5
3. Pope-Toledo	40	3,500	Alan Wood, 3d.....	2:10

GASOLINE STOCK CARS, \$4,001 AND OVER (STANDING START).

1. Knox	30	\$2,600	W. Bourgue	1:33
2. Apperson	55	5,000	C. J. Swain	1:37
3. Apperson	55	5,000	George Davis	1:38 3-5
4. Stearns	60	4,600	Harry Goodin	1:40 3-5
5. Parkin	60		Joe Parkin, Jr.....	1:48
6. Stearns	60	4,600	J. F. Betz, 3d.....	1:48 4-5

FREE-FOR-ALL GASOLINE CARS (FLYING START).

1. Chadwick	50	\$6,500	W. Haupt	1:01
2. Knox	30	2,600	W. Bourgue	1:15 4-5
3. Knox	48		Albert Dennison	1:16
4. Stoddard-Dayton	45	2,700	A. C. Miller	1:18
5. Parkin	60		Joe Parkin, Jr.....	1:18 3-5
6. Matheson	60	6,000	H. N. Harding	1:19 3-5
7. Pennsylvania	50	3,000	L. Zengle	1:20
8. Stearns	60	4,600	Harry Goodin	1:21
9. Oldsmobile	40	2,750	Tom Berger	1:21 3-5
10. Columbia	29	3,000	J. J. Coffey	1:23
11. Apperson	55	5,000	C. J. Swain	1:25
12. Apperson	55	5,000	George Davis	1:27
13. Ford	15	600	A. A. Jones	1:50

FREE-FOR-ALL (FLYING START).

1. Chadwick	50	\$6,500	W. Haupt	:57 2-5
2. Knox	48		A. Dennison	1:12 2-5
3. Parkin	60		Joe Parkin, Jr.....	1:16
4. Stearns	60	4,600	Harry Goodin	1:16
5. Knox	30	2,600	W. Bourgue	1:16 2-5
6. Stoddard-Dayton	45	2,700	A. C. Miller	1:17
7. Pennsylvania	50	3,000	L. Zengle	1:18 2-5
8. Matheson	60	6,000	H. N. Harding	1:20
9. Oldsmobile	40	2,750	Tom Berger	1:22 1-5
10. Apperson	55	5,000	George Davis	1:23 3-5
11. Apperson	55	5,000	C. J. Swain	1:24
12. Jones-Corbin	50		J. Jones	1:52

TWO PACKARDS TIED FOR HAGERMAN CUP.

St. Louis, June 27.—The second annual owners' reliability tour for the James Hagerman, Jr., trophy, which was conducted by the Automobile Club of St. Louis, took place to-day. It resulted in two 30-horsepower 1908 Packards finishing with perfect scores. One was owned and driven by G. E. J. Walsh and the other by Samuel Plant. Both of these contenders also finished last year with no penalizations against them. In accordance with the rules of the tour, which provide that the trophy shall become permanent possession of any one winning it twice in succession, there is a tie between these two for the final ownership of the trophy. The manner of running off the tie will be decided later by a committee selected by the referee.

Of the 25 original entrants 20 started. The course was extremely rocky and hilly. It was 109 miles in length and embraced six controls, as follows: Antonio, De Soto, Antonio, Denny, Sappington and the clubhouse at the finish. The contestants were allotted 1,000 points at the start. From these deductions were made for any mechanical weaknesses that developed. At the end of the run they were examined by a technical committee.

FIFTEEN PERFECT SCORES IN DELAWARE RUN.

WILMINGTON, DEL., June 27.—In the sealed bonnet run of the Delaware Automobile Association to-day, 15 of the 21 contestants finished with perfect scores as follows: Henry McComb Bang, Stoddard-Dayton; J. T. Chandler, Mitchell; William C. Corey, Mitchell; Eugene du Pont's Peerless; Eugene du Pont's Pierce; Eugene du Pont's Thomas; Dr. John C. Fahey, Maxwell; Robert S. Clover, Maxwell; James F. Hoey, Buick; William E. Holland, Ford; J. R. Richardson, Mitchell; Albert Rothschild, Rainier; Joseph H. Shaw, Franklin, and Frank Yerger, Studebaker. The course was to Valley Forge and back, 79 miles.

TWO TOURS TO THE WILDWOOD RACE MEET.

Two tours are scheduled to start to-morrow for Wildwood, N. J., where a race meet will be run on the Fourth of July. One leaves from New York and the other from Philadelphia.

RECENT DEVELOPMENTS IN MAGNETO IGNITION*

By OTTO HEINS, MEMBER SOCIETY OF AUTOMOBILE ENGINEERS. *

IN taking up the subject of magneto ignition, it is not my intention to attempt to cover the entire field of endeavor, nor even to try to outline the improvements made in every form of high or low-tension magneto on the market, within the past year or so. My experience has been confined to the Bosch apparatus, which needs no introduction, and it is my intention to show what has been accomplished in the study of automobile ignition devices as represented by the products of this firm.

The electrical advantages inherent in the ordinary low-tension system of ignition are largely offset by the mechanical complication of the mechanical interruptors, and ignition specialists have long sought to successfully combine the low-tension mag-

by a horseshoe-shaped spring, which passes right over the top of the stem and lies in slots in the sides thereof.

The top of the coil is fitted with a contact screw to which the current from the magneto is led. This magneto (Fig. 2) generates an ordinary low-tension current and is provided with a low-tension distributor distributing the current to the individual plugs, according to the number of cylinders, so that only one low-tension wire for each plug is employed. The distributor disc is shown separately in Fig. 3, as well as the interrupter, which latter is provided for the purpose of timing the ignition.

Fig. 2.—Low-tension Magneto with Synchronous Distributer.

Fig. 4 is a diagram of the electrical arrangements, which will be seen to be similar to those of the Bosch high-tension magneto. A portion of the wiring of the armature is short-circuited by the platinum points of the interrupter, and when the circuit is interrupted, the resulting armature reaction has the effect of raising the voltage of the armature sufficiently to operate the magnetic plugs. The rotating distributor bar is adjusted in such a way that it is always in connection with one of the spark plugs at the moment when the contact breaker of the magneto interrupts the circuit, so that the circuit to the plugs is closed and these are magnetized for operation.

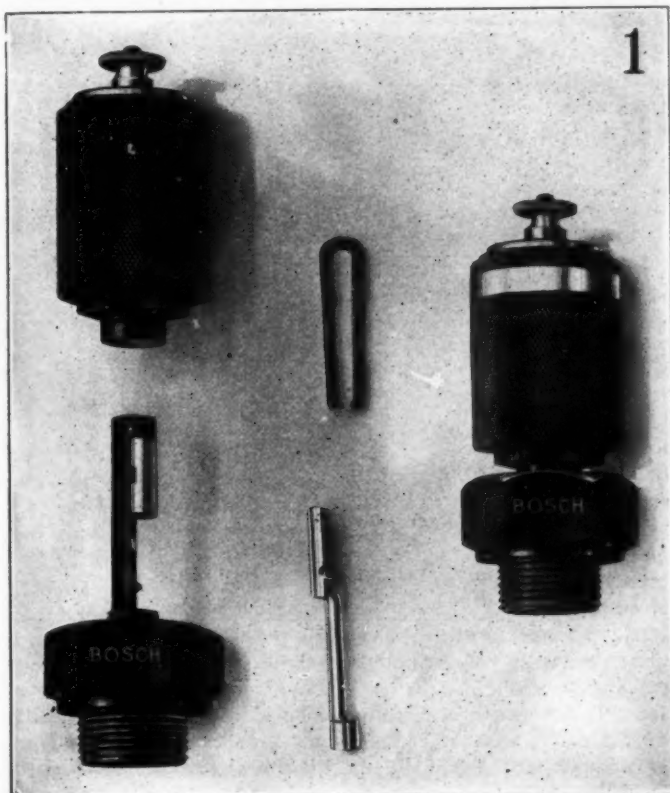


Fig. 1.—Assembly and Components of New Magnetic Plug.

neto-electric outfit. About three years ago the Bosch Magneto Company began experimenting with a magnetically-operated plug device on the Honold System, and last season placed it on the market.

The electro-magnetically operated spark plug is illustrated in Fig. 1. An important part of this plug is the interrupter lever, which rests on a steel knife edge, and one end of which bears on the contact piece, which is screwed into the cylinder wall in the same manner as a high-tension spark plug. At the bottom of the contact piece there is an insulated fixed stem which is magnetically divided in about the middle by means of a brass part, so that when the current passes through the coil, only the portion of the stem above the brass part can be magnetized, and, as a result of this magnetization the upper end of the interrupter lever, which directly faces the magnetized part, is attracted, the lower end simultaneously breaking contact with the contact piece, thus interrupting the current and producing a spark. In the normal position of the interrupter lever, the lower end presses against the contact piece, being kept in that position

*Paper read before The Society of Automobile Engineers at Detroit, June 25-27, Third Annual Summer Meeting.

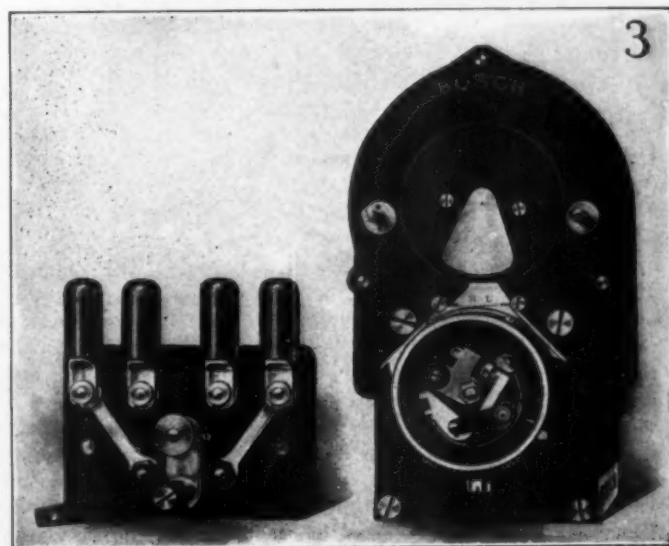
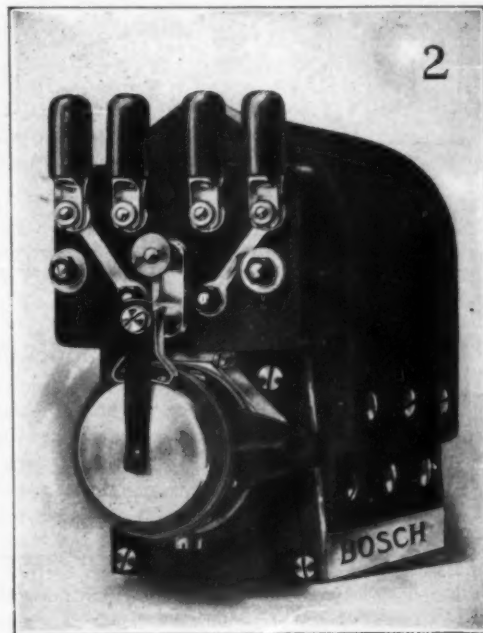


Fig. 3.—Details of Contact Breaker and Distributer of New Low-tension Magneto.

The spark is advanced or retarded by rotating the timing lever, in the same manner as with a high-tension magneto, and the timing range corresponds to an angle of 50 degrees on the armature shaft. The magneto is switched off in the same manner as a high-tension magneto, by making a ground connection. This is done by small plug switches with either a single plug or with a number of plugs equal to the number of cylinders, to enable each

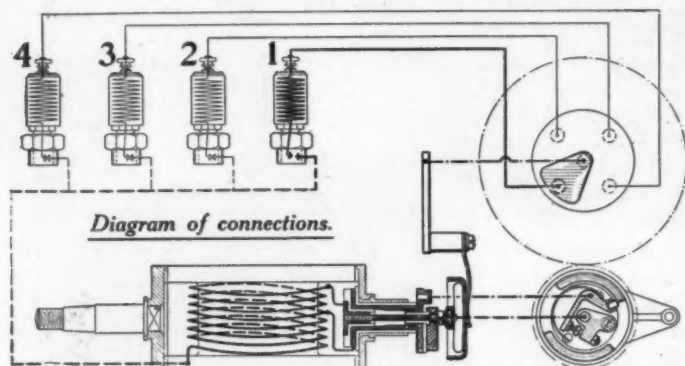


Fig. 4.—Wiring Diagram of New Low-tension System with Magnetic Plugs.

cylinder to be switched out separately for testing purposes, from the seat while the car is in motion. As compared with mechanically-operated igniters, electro-magnetic plugs are far simpler, and they are far more convenient, because they require no separate adjustment, as they are operated by the magneto itself.

Improved High-tension Systems.

During the past season dual systems of ignition have met with great favor among designers, especially among those who adhere to the high-tension principle. The author's firm has developed a synchronized dual ignition system, which comprises one of its various types of high-tension magnetos and combines the advantages of a true high-tension magneto and the coil dual system.

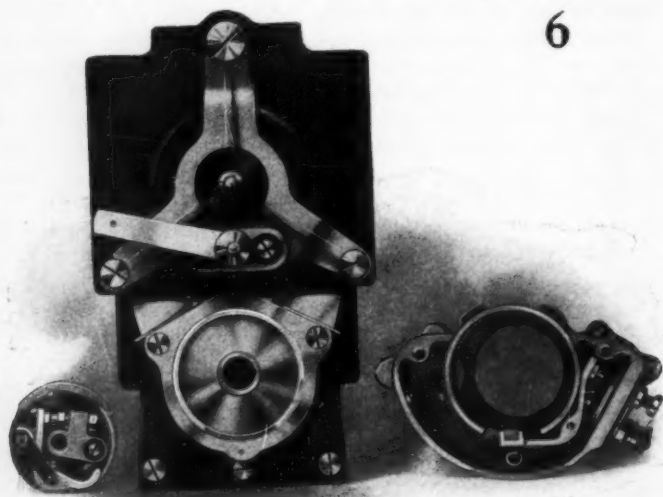


Fig. 6.—Showing Contact Breakers of Magneto for Dual Ignition.

The high-tension magneto, or the generator itself, differs from the standard rotary armature type in two respects only. In the first place, the high-tension connections are slightly altered, and, secondly, an additional contact-breaker for the battery is provided, as shown in Fig. 6, so that the magneto will serve also the function of a timer for the battery, while the one high-tension distributor of the magneto is used with both the magneto and the battery current. All other details of the magneto are similar to those of the ordinary machines, and it is therefore not necessary to describe them here.

For the battery ignition a special coil, as shown in Fig. 7, is

provided, with a self-contained switch and a button for bringing a magnetic vibrator into circuit when desired. These various parts are all contained in a relatively small brass case, designed to be fitted to the dashboard, as illustrated in Fig. 8.

Contrary to usual practice in vibrator coil ignition, the vibrator in this new dual Bosch ignition system is only brought into operation for the purpose of starting the motor from the seat. As soon as the motor is working, the vibrator is cut out and the interruption of the current is effected by mechanical means. Consequently there is no lag in the operation of the circuit interrupter, as in the ordinary vibrator coil system, thus making a synchronized system. If there is any gas in the cylinder, the motor can be started from the driver's seat by simply pressing the button. The coil is of the general form of an H armature, as shown in Fig. 9, and not of the usual cylindrical form with concentric windings. It possesses the same amount of self-induction as the magneto armature, and while running the engine the two systems are absolutely synchronized, and no difference is apparent in the speed of the engine, whether the magneto or the battery is used.

The trembler is only used at the moment of starting. The button switch for bringing it into circuit is fitted in the lid of the case in such a manner as to render it quite water-proof. In order to eliminate all long connections between the switch and

the coil, the switch is directly combined with the brass housing of the coil, the short contact studs being well insulated from each other in the base of the housing. The connections are made by small segments in the bottom plate of the coil frame, the entire coil being moved towards the left or the right to effect the change-over. The switch handle projects through a circular slot in the housing and locks in three positions by a spring, the positions being designated respectively, as "Magneto," "Off," and "Battery." The combination is very compact and can easily be inspected by unscrewing the switch handle and removing the lid, when the coil can be taken out without disconnecting any wire, exposing the components of the switch.

The casing or housing being watertight and made of metal, prevents the coil being affected by atmospheric conditions. No wood is used in the construction. The connections between the dashboard and magneto, as shown in Fig. 10, are made by one quadruple cable, which contains the two high-tension wires and the two low-tension wires. Standard magnetos can be adapted to this dual system by only small alterations.

A New Small High-tension Magneto.

The great popularity of various light runabouts, and the growing use of the four-cylinder motor for such light vehicles, has of late created a demand for a small high-tension magneto outfit. Such a machine, suitable for four-cylinder motors up to 15 horsepower, is shown in Fig. 11. The chief *raison d'être* of this type of vehicle being its low cost of construction, its accessories



Fig. 7.—Dash Coil and Self-contained Switch.

must necessarily be of low cost, and this point has been kept in view in the design of this magneto, though the electrical principles involved and the quality of workmanship are the same as found in the other high-tension magnetos of the Bosch Company.

This magneto is of the rotary armature type and must, therefore, be geared, for four-cylinder, four-cycle engines, to run at engine speed. The device is especially constructed with a view to enabling the layman to understand and use it, and the main parts can be removed without the use of tools. The parts of one of these magnetos are shown in Fig. 12. The interrupter is similar to the standard interrupter, but the distributor disc is of novel design and can be taken off with a jerk by pressing the springs on both sides. To simplify the ignition device, the magneto is generally furnished without any timing device. As these

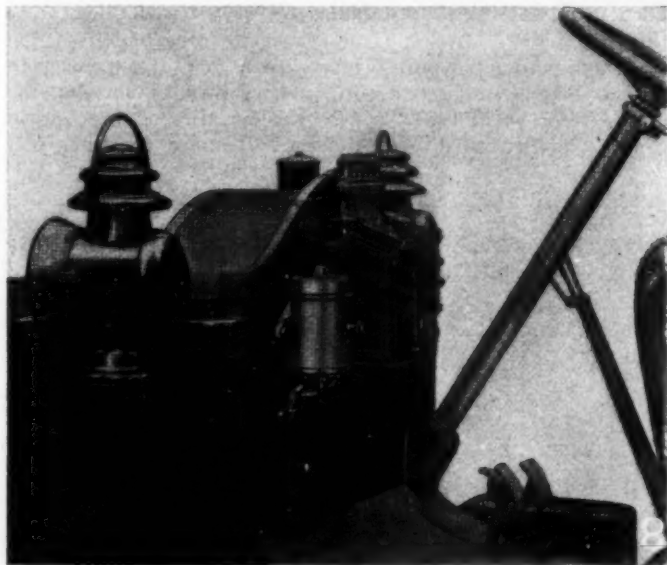


Fig. 8.—Relative Size of Coil Mounted on Dash.

magnetos will generally be used on small cars driven by persons with no special technical skill, the absence of a timing device has the advantage that the engine cannot be abused by incorrect timing. The magneto, however, can be readily supplied with a timing device.

Novel Coupling Device for Two-cycle Use.

On certain engines, particularly two-cycle and racing engines, an unusually large timing range is required. This necessitates the shifting of the magneto armature with respect to the driving

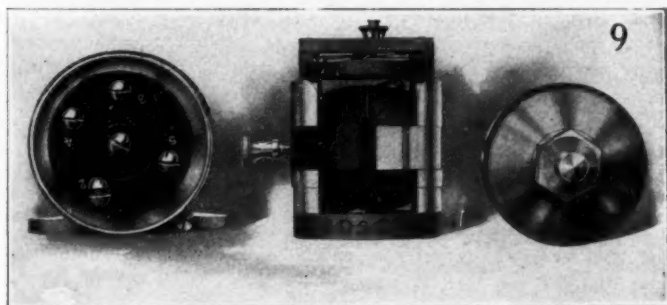


Fig. 9.—Components of Dash Coil and Switch Shown in Fig. 8.

shaft, which can be accomplished by a novel coupling device brought out by the author's firm. This coupling device, shown in Fig. 13, can be attached to practically any type of our magnetos. It consists principally of two rotary sleeves (as shown in Fig. 14), one fitting into the other, both provided with helical slots running in opposite directions, so that by removing the collar which carries pins which extend into the above-mentioned

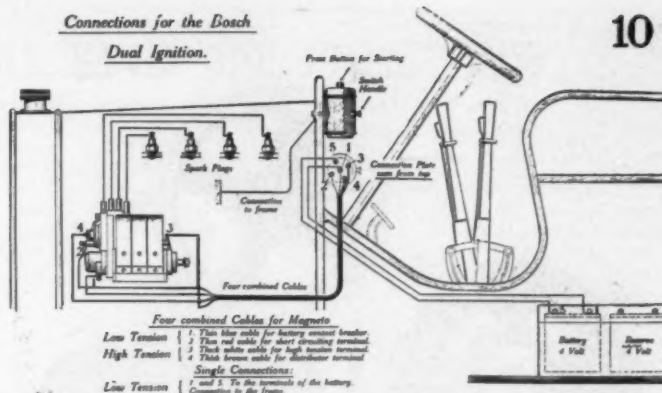


Fig. 10.—Wiring Diagram of Dual Ignition System Using Same Plugs.

slots, an angular movement of these sleeves relative to each other up to 60 degrees is obtainable.

In connection with the presentation of his paper on developments in magneto ignition that have been brought about during the past year or so, Mr. Heins, who has made a special study of the subject for a number of years past, and may well be considered an authority, also delivered an illustrated lecture outlining the development of ignition in the internal combustion motor since the latter first became a practical prime mover. The devices experimented with by Otto and Daimler and by many who followed in their footsteps were illustrated by means of lantern slides, and a complete review of this most important subject to the automobile engineer was gone through in a brief and interesting manner, the lecturer pointing out in a few words just where each inventor sought to improve upon the devices of his predecessors, and showing exactly how each one failed to realize in some important point or other the requirements of the problem to which so much study and attention has been devoted during the past quarter century. The subject is one of absorbing interest for every one connected with automobile engineering, and Mr. Heins' lecture brought out many points of interest.

Supplementary Paper Presented at Detroit.

After having dwelt upon the historical side of the question long enough to give an idea of what the present day ignition systems had been developed from, Mr. Heins went on to deliver a secondary paper of his own, which he had prepared on

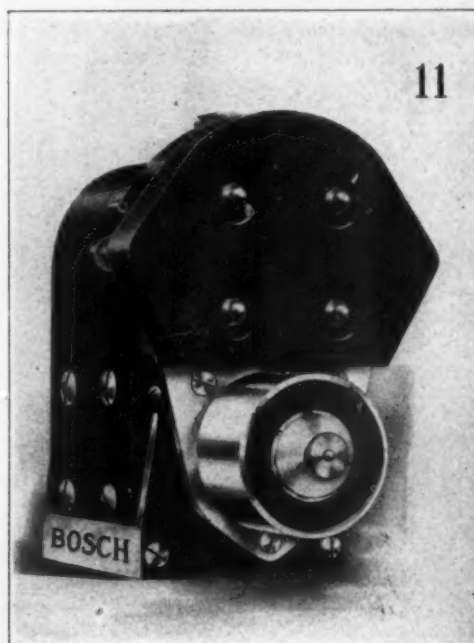


Fig. 11.—Small High-tension Magneto for Low-priced Cars.

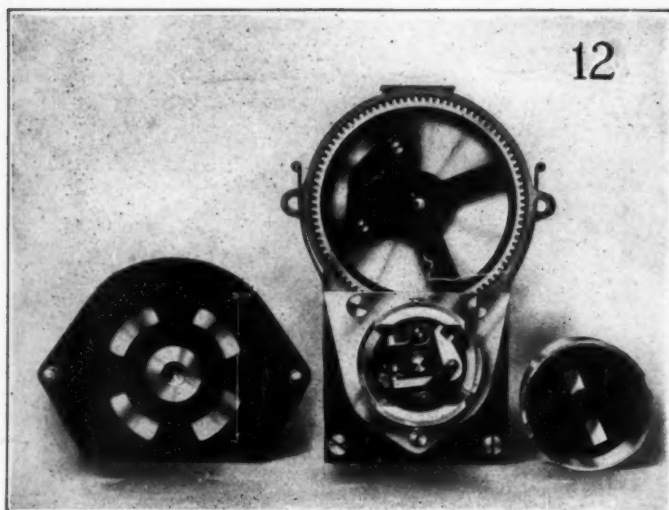


Fig. 12.—Distributer and Contact Breaker, New Small High-tension Magneto.

the subject since the submission of the illustrated paper which appeared in the Transactions of the Society of Automobile Engineers, and which is being reproduced herewith. In this, he dwelt upon the purely technical side of the many problems that confront the automobile engineer in this extremely important essential of every gasoline car, and among the numerous lantern slides that were employed in connection with the lecture, many of them showed the electrical action of the magneto, giving its voltage and amperage under varying conditions as graphically illustrated by oscillographs. He also showed slides which had been reproduced by specially made photographs illustrating the difference between the spark produced by a coil system of ignition and by a high-tension magneto of the true type. The first of this series of photographs showed the appearance of the spark at 25 revolutions per minute, the photographic apparatus employed to take the pictures having been adjusted to run synchronously with the ignition apparatus, so that the results showed a true reproduction of the action of the two competing forms of ignition apparatus as compared with an accurate time factor. At the low rate of speed men-

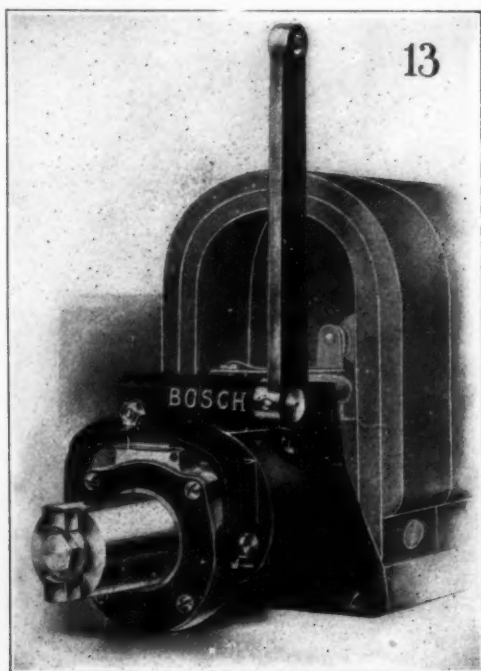


Fig. 13.—Coupling to Give Extreme Ignition Advance.

tioned, the coil spark showed a solid line round part of the arc of a circle on the plate, but when increased to only a few hundred r.p.m., there was immediately apparent a very noticeable gap between each pair of the long series of sparks, and at high speed there was but a single spark, much reduced in intensity, and that occurred very late on the arc of the circle as compared with its original point, although the timing had not undergone any change. On the other hand, the magneto current recorded a substantial arc of light which was apparently not affected in the least by changes in the motor speed and which was unchanged in either timing of occurrence or power by the high rate of motor speed—as a matter of fact, there was a strengthening of the current owing to the much higher speed at which the magneto was being run, but this was not as plainly visible in the photographic reproduction as was the sudden falling off of the same element in the coil spark. Mr. Heins also compared the action of the true high-tension type of magneto with that of the magneto with coil high-tension type, in the same manner, showing the effect of the slight lag caused by the necessity of stepping up the current generated by the armature of the magneto to a

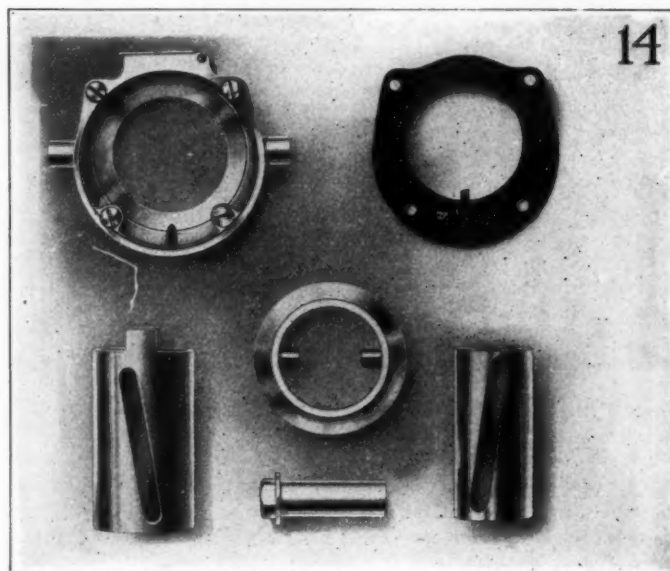


Fig. 14.—Components of New Bosch Coupling Device.

high voltage in the independent coil. He explained the action of different forms of magnetos at some length and then went on to give a short review of the contents of the foregoing paper, descriptive of the improvements that have been made in the Bosch apparatus during the past year or more, and dwelling more particularly on what is without doubt the most radical advance made in this essential—that of the development of a satisfactory type of magnetic plug making it possible to employ a low-tension magneto without the necessity of the complicated igniter action that is now employed where the electric simplicity of this type is desired.

In referring to the new apparatus developed as the result of the past season's experience, special stress was laid upon the fact that, as far as it is possible to do so, both the magnetos and their accessories, such as the new coil switch for the dash, previously mentioned and illustrated, are so designed and constructed that they may be taken apart and readily reassembled without the use of any tools whatever, while their simplicity is such that they are not readily subject to reassembly with an improper relation of the parts when in the hands of even the most inexperienced autoist. The same tendency is noticeable in the case of the new high-tension magneto for small cars in that complication has been avoided by omitting the timing device.

NOTE.—Fig. 5 omitted.

LETTERS INTERESTING AND INSTRUCTIVE

BUYER LOOKS FOR HIS IDEAL CAR.

Editor THE AUTOMOBILE:

[1,446.]—I want to buy an automobile, when I can find one built somewhere near my notion. I am a subscriber to your valuable magazines and have watched the advertising columns, but have not yet found my car (all too heavy). The first safety bicycle I bought was in 1888; it weighed 114 pounds. To-day I have one that weighs only 34 pounds and is more flexible and stronger than the first mentioned.

I have had three automobiles and on account of their low power and heavy weight and unyielding construction they have ground out a small fortune in tires and repairs. Am now waiting for my ideal car. The following are suggestions for specifications: Six cylinders, 4 by 4.3-4 inches, engine and transmission on the principle of three-point support. Wheelbase, about 115 inches. Shaft drive with floating axle, springs semi-elliptic, front 21-2 inches wide and 50 inches long, rear side springs, 21-2 by 60 inches with cross spring at rear, all side springs nearly straight, with sufficient number of leaves under side to support load and one or two leaves on top to prevent excessive upward bounds. Wheels, artillery type, light construction for 36 by 3-inch quick detachable tires, body of light construction, side entrance, to seat four people. Bearings, Hess-Bright throughout; weight complete, not to exceed 2,000 pounds.

Will you kindly answer through your columns if there are any cars now made that will come quite near the above specifications. In my opinion, a car designed on above lines and kept within the 2,000 pounds would outsell any car on the market to-day.

Norwich, N. Y.

C. W. L.

We do not know that there is any car on the market at the present moment that complies with your specifications in their entirety, and doubt very much if such a car is built, but there are some that approximate it in more respects than one. Every autoist of any experience has formulated a more or less clear idea of what he wants in the shape of a car, but as yet we do not know that any of these ideal cars have been built. If there are any of our readers who think they have cars that come sufficiently near to the requirements as above set forth, here is his chance to trot them out for inspection.

ANOTHER COMPARISON OF IGNITION SYSTEMS.

Editor THE AUTOMOBILE:

[1,447.]—Will you please answer through "The Automobile" the following questions? Would you advise purchasing a car equipped with make and break, using low tension magneto and jump spark plug battery ignition systems? Comparing make and break using low tension magneto, and jump spark using high tension magneto, what are the advantages and disadvantages of the different systems?

C. A. LEWIS.

Chicago, O.

We would, where the advisee was inclined that way, just as we would advise an intending purchaser to invest in a car equipped with a high-tension system where he favored the latter. In the combined system you mention, the battery end is only used for starting, and practically all running is done on the magneto, although it is also possible to start on the latter by spinning the motor. To compare the two systems briefly, it may be said that the low-tension is simple electrically and complicated mechanically, while the high-tension system involves electrical complication with mechanical simplicity, but it would seem as if their differences were about to be merged by the adoption of a magnetically operated plug, using current from a low-tension magneto, this system having just been placed on the market. But even with the mechanism now required to operate it, we think the consensus of opinion is to the effect that the low-tension system is the more reliable. It is considerably more expensive to make than the average high-tension system, as the small parts of the ignitors and their operating mechanism must be made very accurately in order to give good service. The almost entire freedom of the low-tension system from electrical troubles is what causes it to appeal to many, while the lack of mechanical complication is a strong argument in favor of the high-tension system of ignition.

CONTROL BY SPARK OR THROTTLE?

Editor THE AUTOMOBILE:

[1,448.]—In our family are a '05 20-horsepower Stevens-Duryea and a '08 18-horsepower Stoddard-Dayton. The Stevens engine seems to speed up on the spark and the Stoddard on the throttle. On high the speed of the Stevens seems to depend on the spark and in the Stoddard the throttle. The timer on the Stevens seems to turn farther when advanced than that of the Stoddard. Does the carbureter make the difference, or what is it? If you would please answer I would be much obliged, as it is queer to run one with the spark high and the other with it low.

Waterbury, Conn.

HOWARD P. HART.

You do not state whether either of the cars in question is equipped with a magneto or not, but from what you say, we presume not, and in this case the difference in running is to be accounted for by the factor of lag in the two ignition systems of the cars. According to popular impression, electrical action is absolutely instantaneous, or in other words, that the time intervening between the making of contact and the accomplishment of the desired result at the other end, is not a measurable period. This is far from being the case, for while electrical action is extremely rapid, magnetism requires an appreciable interval of time to manifest itself. The iron core of the primary winding of the coil must become magnetically saturated before it attracts the armature of the trembler, and both the inertia of the latter as well as the resistance of its spring must be overcome before the coil can act, so that there are no less than three factors that influence the time of occurrence of the spark in the cylinder. If the trembler spring is weak, there will be a further delay in rupturing the contact with a corresponding delay in the occurrence of the first high-tension impulse in the secondary winding.

If the spark is caused to occur exactly at the upper dead center, or a little before the piston reaches that point, then only the throttle will have any effect on the motor's speed, assuming, of course, that the ignition adjustment is allowed to remain as above stated. This is evident on several foreign makes of cars on which there is no provision whatever for advancing the ignition, the occurrence of the spark being retarded slightly for starting only. Such cars control on the throttle alone, and this would appear to be the case with your Stoddard-Dayton, a view that appears to be further supported by the fact that a greater range of timing is provided on the Stevens-Duryea. We think, however, that if you will always run the motor of the latter with the spark pretty well advanced, consistent with the work it is doing, you will find it possible to effect most of the control by means of the throttle, and you will then be getting a higher percentage of efficiency out of the motor, as the delayed spark wastes fuel and tends to heat the motor, owing to the slow burning. It will be evident that when ignition is taking place at the proper point, only an increase or decrease in the amount of fuel can have any effect on its speed and power. Advancing the spark only gives increased power of itself by permitting the motor to take better advantage of each charge of fuel. In other words, it is not adding to the power that can be obtained from a certain charge, but is producing a larger percentage of effective work from the same charge than where the spark is late.

WHAT IS THE SMALLEST ESSENTIAL PART?

Editor THE AUTOMOBILE:

[1,449.]—Will you kindly publish the name or description of the smallest essential individual part or piece of a car which goes to help make up the assembly of parts constituting the modern gasoline touring car ready for use. By essential I mean a part which, if removed from the car, would render it not usable.

Marshall, Minn.

A. D. HARD, M.D.

This is a query the answer to which will depend upon the car itself. Assuming a single-cylinder car using high tension ignition, probably the platinum contact piece from the end of the trembler

screw is the smallest piece, the loss of which would render running difficult. It measures not much more than 1-16-inch in any dimension. It might be possible to run without it, but not satisfactorily, or for any length of time. The loss of the screw itself, which measures 1-2 or 3-4-inch across its circular top and is about 3-4-inch long by 1-8-inch diameter, would prevent running altogether. The loss of the locking nut from the needle valve of the carbureter might prevent any use of some cars, owing to the needle point turning very loosely. This is somewhat akin to the platinum contact point, as the car could be used, but the loss of the needle itself would prevent this and probably it is next on the list, although on some low-priced cars on which pinned joints are employed the loss of the pin from such a place as the connection of the propeller shaft to the universal would render the car useless until it was replaced. On a car using a high-tension magneto alone for ignition, the loss of the small carbon brush collecting the current from the primary winding of the armature would prevent the starting of the motor. This part is doubtless next in size to the platinum screw above mentioned. We are not certain that any of the foregoing comply exactly with the requirements of your definition of essential, individual parts, and they do not, if you mean by this a part complete in itself. In such a case, the loss of a spark plug from a single-cylinder motor would probably answer your query as well as anything. A little study of the question thus raised seems to lead to an endless number of possibilities and attention to the latter on the part of amateur autoists would reveal things about their cars the very existence of which they have never even suspected and would be the cause of their becoming very much more familiar with the machines they have been driving.

PREVENT OIL REACHING THE CLUTCH.

Editor THE AUTOMOBILE:

[1,450.]—Will you please give me some information in your department "Letters Instructive and Interesting"? I have a 16-horse-power touring car, planetary gear, leather cone clutch for direct driving, located in flywheel. Flywheel is not solid, but is spoked. I have replaced the leathers in the clutch once before, but not on account of the clutch slipping. Just replaced them when car was taken down because it was good time to do so. The leathers in the clutch are not old, but clutch will not hold. Slips all the time. I put in stronger springs, but this did not help. I think it is on account of oil from crankcase coming out through main bearing on flywheel side and getting in clutch through spokes of flywheel. Have tried everything. Carbide dust from gas generator, street dust, Fullers-earth, and Fullers-earth mixed with glycerine, all to no avail. Clutch will begin slipping again in less than two miles running after fixing it. If you can help me out same will be appreciated.

R. S. TRULOCK.

El Reno, Okla.

No friction clutch can be made to hold where it is exposed to lubricating oil in any quantity and nothing that can be put on the facing will prevent the lubricating oil from causing it to slip. To remedy such trouble it would be advisable to attend to the end bearing of the crankshaft in order to prevent as much oil as possible from coming through there, as was doubtless the case when you got the car originally, and also to fill the spaces between the spokes of the flywheel with thin sheet metal or a similar oil-guard, unless the flywheel is meant to act as a fan, in which case it will be necessary to rely upon keeping the main bearing oil-tight.

CAUSE OF A KNOCK IN ONE CYLINDER.

Editor THE AUTOMOBILE:

[1,451.]—Kindly advise me through your "Letters Interesting and Instructive" what the trouble is with a two-cylinder opposed engine which runs smoothly on the high, but knocks in the front cylinder when the clutch is thrown out and gas and spark are retarded. Is this due to a loose part, and if so, where is it most likely to be found? Battery good, coil in adjustment, and no other trouble apparent.

READER.

Milwaukee, Wis.

If caused by a loose part, this will most likely be found in the connecting rod or piston pin bearings, but from your statement of the case it does not appear to be trouble of that nature, as

considerable looseness in these bearings will go unnoticed as long as the motor is run without load. If it were such a knock it would be most apparent when the clutch is in and the motor is driving the car, particularly on a grade. There may be something wrong with the adjustment of the ignition timing, by means of which the forward cylinder is caused to fire much sooner than the other, so that when the spark is retarded considerable back pressure is set up, which would account for it.

FRICTION-DRIVEN CARS IN HILLY COUNTRY.

Editor THE AUTOMOBILE:

[1,452.]—What has been the experience with friction drives for rough and hilly roads, such as are common in New Hampshire? I am told by almost everyone that they will slip, and are only good for fine roads.

JAMES P. MELZER.

Milford, N. H.

This is something that we will have to refer to our readers for a definite answer, not having had any experience in the use of such a car in hilly country. It is well-known, however, that the friction transmission is an excellent type where the load is at all uniform or steady and that its chief drawback is not so much its inability to take care of an overload as it is to transmit an excessive load, suddenly applied, as in pulling the car out of a mudhole, or in starting from dead on a very steep grade. We understand, however, that manufacturers of cars employing this type of transmission have developed it to a point where it is unusually successful in situations for which it was formerly considered as practically valueless. Every car is equipped with a frictional element in some part of its transmission, namely, the clutch, so that it is not the use of friction for driving, but the manner in which it is applied, that constitutes the drawback. Doubtless some of our readers will come forward with further information gained from personal experience.

WILL SOME READER OBLIGE ON THIS?

Editor THE AUTOMOBILE.

[1,453.]—I would like to ask if any of your readers have tried the Holley 1908 "puddle" carbureter on the two-cylinder Autocar runabout and with what results?

G. P. WELLS.

Fulton, N. Y.

We presume the inquirer refers to the Venturi tube type of carbureter made by this firm, in which there is always a small pool of gasoline present, no needle valve being employed, so that this carbureter functions for starting as a surface type and then brings the Venturi tube into action, so that we have taken the liberty of quoting puddle in the foregoing letter. Doubtless some information on this point would be appreciated by other readers as well.

AUTO PAPERS PUBLISHED ABROAD.

Editor THE AUTOMOBILE:

[1,454.]—Kindly tell me the names of some French and English automobile papers; also what language they are printed in, and if they are illustrated, in "Letters Interesting and Instructive."

McHenry, Md.

H. T. CHITTENDEN.

The *Autocar*, *Automotor Journal*, *Motor* and *The Car* are among the leading English automobile papers; all are printed in English and are profusely illustrated. Any of them may be reached by addressing them at London. *Omnia* and *La Vie Automobile* are the leading French papers, are printed in that language and are well illustrated. *L'Auto* is a daily published in the usual daily newspaper form. All are issued in Paris.

CHEWING GUM AS A RADIATOR REPAIR.

Editor THE AUTOMOBILE:

[1,455.]—Referring to your "Letters Interesting and Instructive" about repairing radiator leaks, I agree with you that there is no practical way to make a permanent repair except having it soldered by a competent repair man. I have, however, made temporary repairs which have run nearly a whole season without leaking, by the use of ordinary chewing gum (the pepsin or tutti-frutti kind); pressing it over the leak like putty.

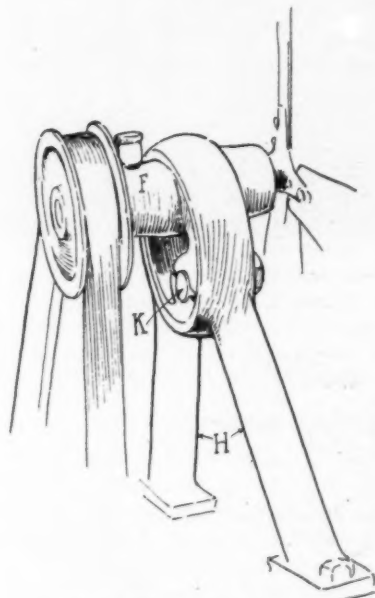
This has the advantage of stopping small leaks for a time without filling up the circulating system like bran or flour.

Lebanon, N. H.

CHAS. S. DAVIS.

AMONG THE AUTO FACTORIES OF INDIANAPOLIS

INDIANAPOLIS, IND., June 29.—There are seven factories in Indianapolis directly interested in making motor cars, and a host of others which manufacture essential parts and accessories. Of these factories one has been running a night force since last October and through the thick of the money flurries; while the resourceful executive of another concern,



Fan Adjustment of Premier.

having found a small plant insufficient for its ever-growing needs, has resorted to the use of tents to help out the cramped floors, with the result that members of the firm are not infrequently rallied to reveal the day's output of available factory space. Nearly all of the remaining plants are busier than their capacity normally warrants, so that the explanation of the "smiles that won't come off" is not far to seek. Almost every conceivable school of motor car practice is represented. The new Premier may be justly described as the machine of standard practice par excellence. The firm's latest motor is as neat, as refined and as representative of the best in engine construction as any motor in the world. There are many things about this particular engine which are very interesting, and of them, before entering into details, mention must be made of the employment of low-tension ignition. The use of a low-tension ignition system by a new firm, or a firm whose production had hitherto been very limited, would not be so remarkable, but its adoption by a concern which previously had sworn by a high-tension system is a change in essential practice deservedly claiming attention. The origin of the change of ignition system was the adoption of a six-cylinder model.

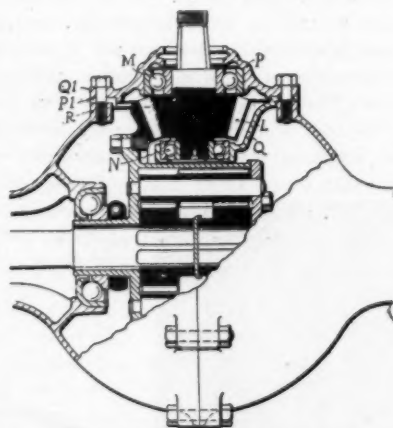
The Premier experience with high-tension systems in conjunction with the six-cylinder motor, particularly at high speeds, led them to search for a practice which, while of especial simplicity, would nevertheless be independent of engine speed for its efficiency. The present make-and-break system is the result and is a fine example of the scientific mechanic's art. In general principle it is an ordinary make-and-break operated by horizontal cams, the plugs being located in a valve cap of either cylinder. So far it resembles the practice of two well-known foreign cars—the Itala and the Weigel—but its essential difference lies in the action series of the hammer motions. In the two cars mentioned a circular cam has a depression formed in

its profile against which the hammer-operating lever is caused to bear by means of a tension spring, the spring being connected to the fellow operating lever of the adjacent plug, which bears on an entirely similar cam. The action in this case is as follows: The cams, having a circular formation, merely sustain the hammer lever against the action of the spring until such time as the depression is reached. Then the hammer lever drops until contact is made within the cylinder, directly after which, the end of the depression being reached, the contact is broken and ignition occurs, the circular portion of the cam resuming its function of holding the hammer arm out of contact.

In the Premier system the general arrangement is identical with the difference that the spring is utilized to break the circuit after the cam has caused contact to take place. In order to render the making of the circuit sure and to provide for slight inaccuracies of setting, and also to compensate for possible wear, the Premier has developed a very pretty "automatic take-up," which is illustrated. As will be readily seen, the hammer lever is made up of two pieces, the one in rigid connection with the hammer proper and the other pivoted about a sleeve formed by extending the boss of the above-mentioned lever. Inspection of the illustration shows these levers at A and B respectively. Lever A has an open jaw formed at its free end which corresponds to a block section formed in lever B. The jaw on A is slightly wider than the corresponding portion of B, so that the lever B can move relative to the lever A. The small spring S causes the lever B to lie snugly against one side of the jaw on B. When the cam C revolves it is obvious that it will move the combination lever made up of the levers A and B until contact is made within the cylinder, after which any further movement is taken up by the clearance between the lever B and the jaw on A. It is easy to see that by setting the plug initially so this clearance is absorbed, or nearly so, that wear to the amount of the clearance must take place within the cylinder before resetting is called for.



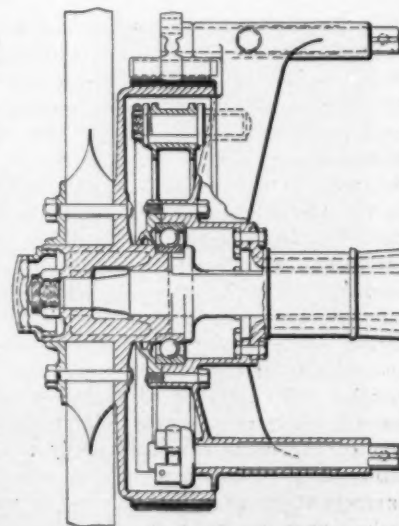
Water Pipe of Premier.



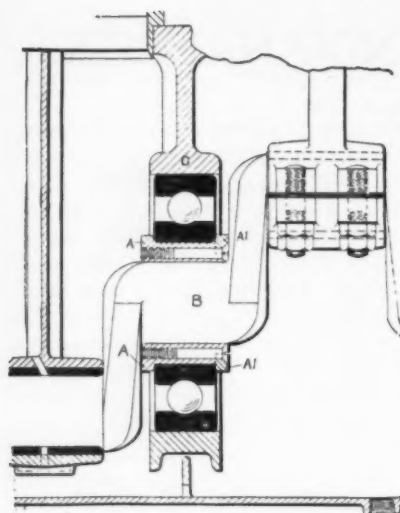
Premier Rear Axle Support.

Care in Ignition Workmanship.

The system is especially ingenious and equally effective; not that the effectiveness shown by it in practice is due so much to the design of the plug but for the reason that many of the manufacturers of low-tension ignition systems forget—perfect workmanship. At the Premier plant a small department has been created to manufacture these low-tension plugs, and it is equipped to turn out only the highest quality of work. Finishing of opposed working parts is accomplished by means of crocus powder lapping, and the most rigid inspection is maintained. The particularly impressive

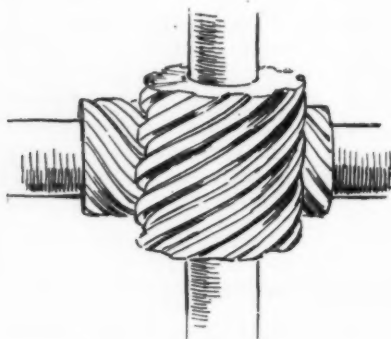


Premier Brake Construction.



Ball Bearing on National Crankshaft.

to maintain a high production rate. It would be impossible to enumerate the thousand and one kinks found there, but one or two examples may be interesting. For instance: The Premier people use a cast gun iron crankcase. Another point which is interesting from a manufacturing standpoint is the way in which the water pipes are made up. Most people know that a sheet metal double or triple taper water pipe for the head of an engine is not the cheapest or easiest thing in the world to make. The taper part is easy enough, and the bend at the small end, but the remaining inlets are difficult and costly if made by the coppersmith. The Premier factory makes the taper tube *A* and the single bend and uses castings *B* and *C* for the remaining



Premier Spark Advance.

handling system is a point which hardly appeals to the average business man, but there are comparatively few people who realize—even though they be salesmen directly connected with the motor car industry—the extraordinary number of parts there are in the modern multi-cylinder machine. If, however, they do realize that the details are numbered in the thousand, they will begin to appreciate the thoroughness with which the organization must be carried out in order to avoid overhead and dead changes eating into the legitimate profits. In the Premier factory the systems are particularly effective, and although not especially novel are exceptionally well operated. The stock room—a general source of indefinite information at the end of the financial year in only too many plants—is most thoroughly safeguarded from unrecorded inroads. This digression must be looked upon as the natural sequel to a description of a few of the neatly economical

point is that the hammer and anvil points of the plug are actually liberally tipped with iridio-platinum insertions. One had begun to forget such things in these commercially hard manufacturing times.

The Premier factory management certainly understands the relation of a dollar to a dollar's worth. It does not spend any unnecessary money at that plant, but what it does spend has had such a foundation laid in the way of jigs and tools that it is not difficult

to maintain a high production rate. It would be impossible to enumerate the thousand and one kinks found there, but one or two examples may be interesting. For instance: The Premier people use a cast gun iron crankcase. Another point which is interesting from a manufacturing standpoint is the way in which the water pipes are made up. Most people know that a sheet metal double or triple taper water pipe for the head of an engine is not the cheapest or easiest thing in the world to make. The taper part is easy enough, and the bend at the small end, but the remaining inlets are difficult and costly if made by the coppersmith. The Premier factory makes the taper tube *A* and the single bend and uses castings *B* and *C* for the remaining cylinder leads. Another kink is the way in which the lower half of the crankcase is made up. A gun iron frame *D* is covered with sheet steel *E* riveted into place. The composite job is as light as an aluminum casting and has certain obvious advantages of its own.

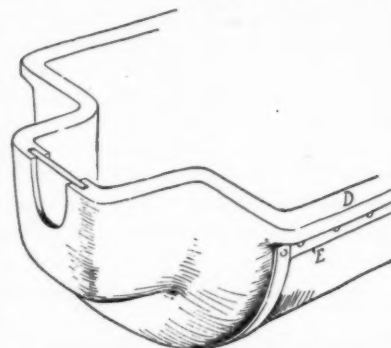
System Above All.

The importance of perfection of the handling

kinks which have already been considered in this connection.

To return to technicalities, the fan adjustment of the Premier is soundly designed and comes as a distinct relief from the various twisted hoop iron crudities which are only too frequent. It consists, as a glance at the illustration will show, of an eccentrically formed sleeve carrying the fan spindle *F* and its bearings mounted in a bracket *H* bolted to the forward end of the crankcase. The fan pulley is for a V belt and is remarkable in this respect; but the neatest thing about the construction is the means adopted to retain the adjustment of the belt tension. The eccentric about the bearing sleeve is split with a saw cut, this dividing a taper hole. A taper pin *K* is located in this hole and can be drawn down by a nut. The act of tightening the nut causes the eccentric to expand within the bracket carrying it and so lock itself frictionally in position.

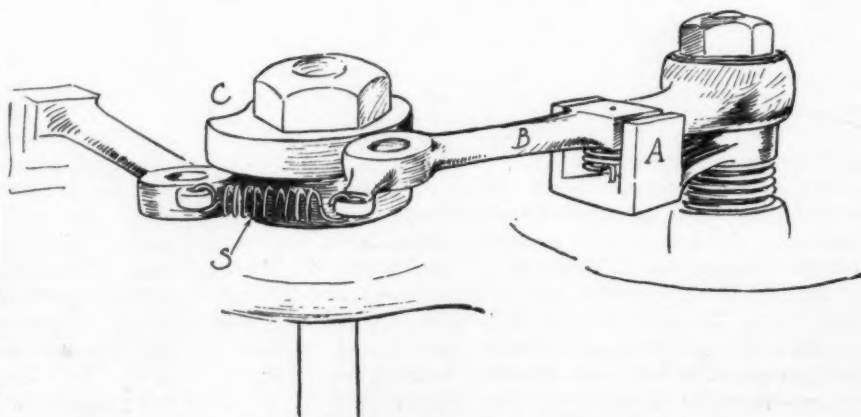
Probably the Premier rear axle contains the greatest novelty in the car. This is a semi-floating type, on Hess-Bright ball bearings, and in respect of being semi-floating alone is remarkable, but apart from this point there are some details as clever as they are novel. One of the best of these is the way in which the bevel driving pinion *L* is supported by ball bearings at the base *M* and the apex *N*. The saucer-like castings *P* and *O* are used; dished diversely, each having a circular flange. These circular flanges register



Premier Crankcase Construction.

together and are in contact when assembled; within the space between the two lies the driving pinion *L* supported fore and aft by Hess-Bright ball bearings *M* and *N*. The coincident flanges *P* and *Q* also register with a similar flange *R* formed by the axle castings so the assembled pinion housing bolts right into place and completes the axle housing assembly. The inner saucer-like casting *Q* is cut away for about a quarter of its circumference through the dished wall, this opening permitting the meshing of the housed pinion with the driven bevel gear. It is just a feature of this axle design that everything on it is circular, but it is one of those features that permit one manufacturer to turn out a high-class job at a reasonable price, while another gets out badly with a less efficient though more complex system of handling.

In one or two factories they have the design and production so schemed that rapid and accurate work is not only possible but difficult to avoid doing. In others, notwithstanding elaborate jigging, much money is sunk unnecessarily where the designer might have accomplished much by a variation of a decimal of an inch in a facing, a bore, a flange, etc. And it is noticeable,



Make and Break Mechanism of the Premier.



National Motor Used for the Generation of Electricity.

too, that simplicity, rigidity, cheapness in the shop and efficiency invariably go together, as they are all but the results of a modern system of manufacturing automobiles or other machinery.

A Thorough Testing Scheme.

To go back to the Premier factory, however, and the things done there, there can be no better indication of the policy of the firm than the thoroughness of the testing. There is none of the slap, dash, that's good enough system that is found once in a while even among manufacturers selling high-priced cars. Each and every engine, four or six, is run first as a dummy, then light, and lastly has to stand a steady pull at overload for a fixed time. What is more, the system is lived up to thoroughly—there is no question of bye-and-bye. The engines have to pass the full test before they get to the assembling floor—rush or no rush. Then the chassis come out and get to the road testers, who set a strenuous pace. Not that this phase is peculiar to the Premier testers—the National, the American, the Marmon and the Overland all do the same, and inasmuch as there is very healthy rivalry among the testers of the various Indianapolis factories, there is no doubt that the road testing is thorough, though the speed laws outside the city limits may be annihilated at times.

National Car All Made in Home Plant.

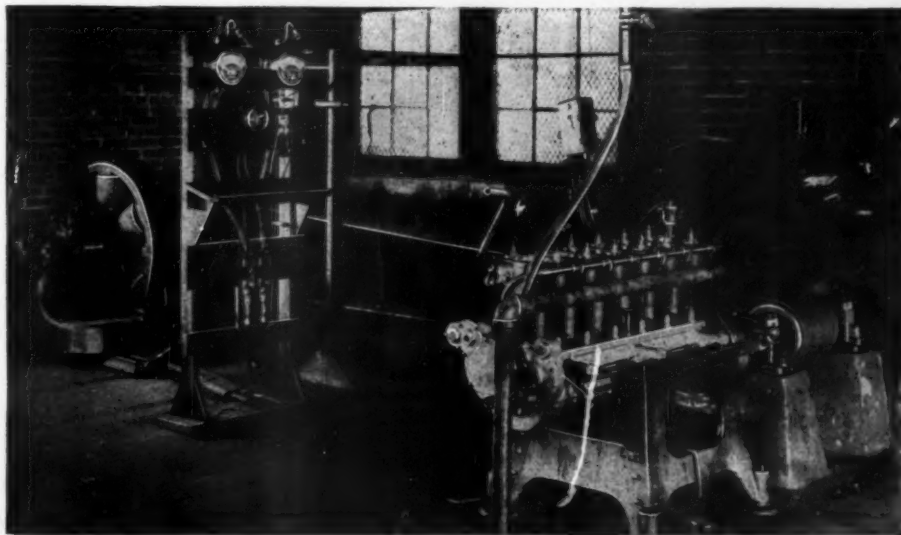
So much for the Premier line of automobiles. At the other side of the city lies the main plant of the National company, which by the way, possesses two, one—that already mentioned—where the chassis work and assembling is done, and the other, where the engines are built and tested. The former is quite a large place, fully and busily occupied. With the manufacturing end of the product well along, interest is centered upon the assembling floors, and here exceptional activity can be noticed. They build three models in the National plant, build them from stem to stern, and it is not hard to realize that with these moving through the plant the organization work has to be made more comprehensive than where only one or two models with entirely duplicate parts are the standard product.

As no doubt many of THE AUTOMOBILE's readers know, the National company has many especial points of interest in its 1908 engine, among which not the least

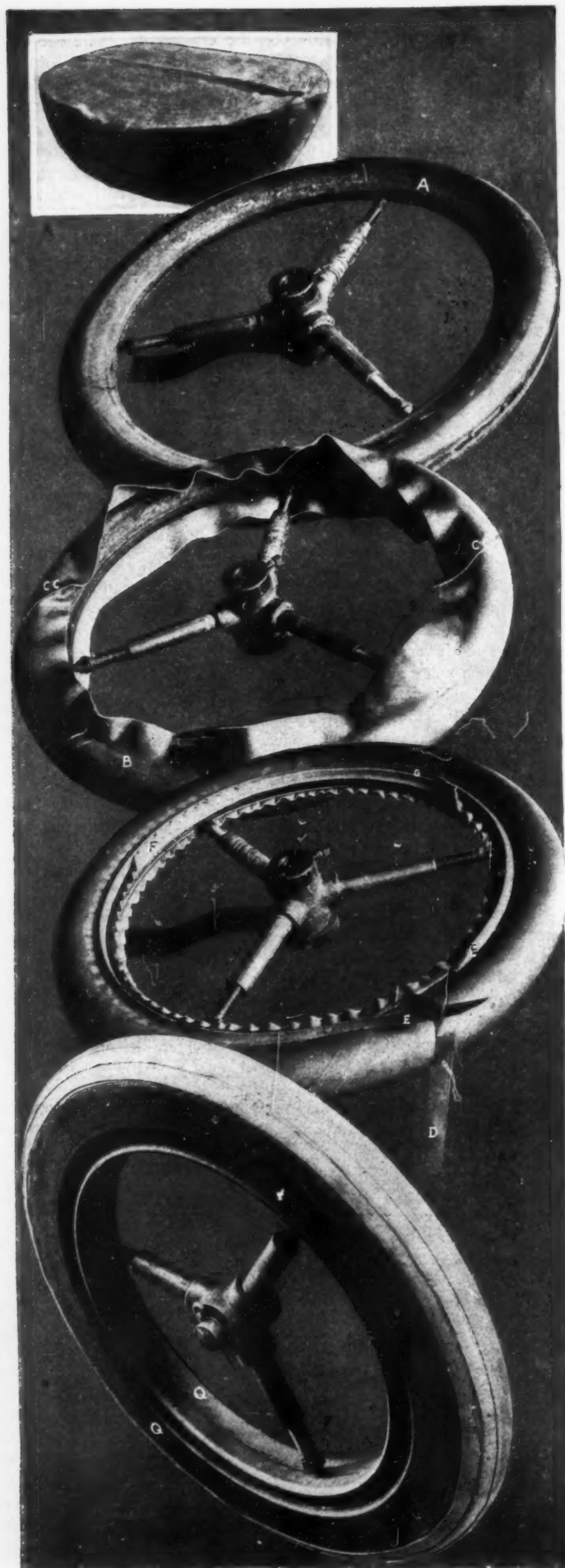
must rank the use of Hess-Bright ball bearings on the crankshaft. The use of radial ball bearings on a crankshaft is a practice which, having been developed abroad, is used by but few people on this side of the Atlantic. The reasons for this are twofold: Firstly, the construction is necessarily expensive, and, secondly, apart from the expense of the ball bearings, there are some engineers who do not approve the practice. Opinion in this direction appears to be very evenly divided, and there is no doubt that where ball bearings are used freedom from lubrication trouble and extraordinary accelerative properties are attained. Moreover, in the case of a six-cylinder engine it permits of a shortening of the over-all dimensions, and, apart from any mechanical advantages derived, this shortening of the engine, even though it be a matter of a few inches, is quite important, as it permits a reduction of wheelbase—

the bugbear of the six-cylinder machine. The National company uses what is known as the "threading system" and secures the bearing of the shaft by means of split sleeves. The bearings employed have a bore sufficiently large that they can be passed along the shaft, the collets being removed to render the necessary diameter of bearing as small as possible. In order to secure the bearings to the crankshaft a split foundation collar *A* and *A1* is used, which when assembled corresponds to the bore of the inner race of the bearing. This collar is located positively with the crankshaft *B* and it is impossible when the bearing is in place for any derangement to occur. The bearings being assembled on the shaft, it is necessary to make sure that the shafts are quite straight after the handling, and in the National engine plant the straightening is done with the help of a very ingenious device. They are then ready for placing in the crankcase and it is very noticeable in National practice that the ball bearings are located directly in the aluminum *C* of the crankcase without the use of intermediate hard metal cages.

There are a number of other ingenious devices for labor-saving purposes which indicate how closely the National executive keeps after its factory costs. Prominent among these is a row of valve-grinding machines which will handle the most refractory valve-seating job in about one-twentieth the time it can be done by an expert mechanic by hand. However, as usual with factories making their own engines, the engine testing room is the pride of the National plant.



Testing One of the National Six-cylinder Motors.



THE MAKING OF G & J TIRES.

The manufacture of a pneumatic tire is undoubtedly one of the least known operations and processes in connection with the motor car. The public is familiar with the making of castings as well as the finishing by grinding and machining, but is decidedly unfamiliar with the manufacture of a pneumatic tire. Due to the kindness of the G & J Tire Company, Indianapolis, Ind., THE AUTOMOBILE this week is able to show eight stages in the process of manufacturing tire casing, each of these being illustrated by reproduction of photographs specially taken in the G & J factory.

The rubber used in the manufacture of any standard motor car tire is composed largely of the Brazilian product, principal among which are those varieties known as para rubber. The three most popular grades of this rubber are fine, medium and coarse, and are obtained principally from the territory covered by the Amazon and its tributaries. The rubber mostly used at this plant is fine para, which in itself has many classifications, but has in all its various grades a very uniform quality. It is usually shipped in the form as shown in illustration A, which is known to the trade as a rubber "biscuit." On arrival at the factory these biscuits are placed in large vats of hot water in order that they may become slightly softened before the washing process is begun. They are then placed in the washing machines, which are built of spirally corrugated rolls, and are passed through these many times with jets of water playing on the rubber the whole time, thus removing any foreign substances that may have been picked up with the rubber, and at the same time sheeting out the rubber into long thin sheets which, when thoroughly washed, present a spongy, porous appearance. These sheets are worked down to a thickness of about 1-16 of an inch, so that the greatest possible surface of same may be exposed to the air.

Illustration B shows these sheets in the process of drying. The rubber is taken from the washers to the dry-room and is allowed to remain there until every element of moisture is absorbed therefrom. Usually this process will take from six to seven weeks, and care has to be exercised to prevent the rubber from becoming overdried, and oxidizing. Before the rubber is compounded, an expert goes through the dry-room and carefully selects from his rubber the kind and grade that is most particularly adapted for the special requirement that he may have for same.

The rubber is then taken to the compound department, where certain inorganic substances are added to it, so that the necessary gravities and vulcanizing ingredients may be provided for. From this department it is turned over to the mill room, and in the process of milling all these various ingredients are evenly distributed, and the whole is kneaded into a soft plastic state, which enables the calender man and tire builders to handle same. By a process of calendering, the friction gum is evenly distributed on a specially woven fabric, made from selected sea island cotton of long staple and great tensile strength. The meshes of this fabric are filled during this process with the gum composed entirely of fine para—and a series of small rubber rivets are thus formed which unite the various layers of fabric together during vulcanization into one compact and homogeneous mass. Great care is exercised during this process to prevent the fabric from becoming strained either in the warp or filler, the idea being to retain to its fullest extent the tensile strength of the fabric.

The fabric thus treated is in rolls varying from 110 to 120 yards in length, which, after being calendered, is taken to the cutting room, where, according to the sizes of tires required, it is cut into strips of varying widths.

Now comes the manufacture of a tire. The rubber is by this time ready for the tiremaker, who has at hand a cast-iron core A, Fig. 1, on what is technically known as a buck and spider, being a swinging arm which permits of readily moving the cast-iron core A in each direction. Before starting the manufacture of a tire, the core A is thoroughly cleansed and dried, after which it is covered with the first coating of a rubber solution.

The tiremaker having prepared a strip of fabric B, Fig. 2, made of closely woven sea island cotton and impregnated with pure gum rubber, cuts a series of strips from this on the bias and stretches them tightly over the core A, the illustration showing the diagonal joining in the strips B at point CC. It would appear that trouble would be incurred in having the fabric lie closely and smoothly around the core A, but owing to the bias cutting the workman is able to roll it down without difficulty until perfect conformation with the core is secured.

Having covered each diagonal joint of the fabric strip B with a film of pure rubber, he applies a second layer of fabric identical with the first and then after lining the inner edge of the embryo tire with a pure rubber strip D, Fig. 3, he proceeds to insert the clinch or bead E. This is made from many strips of fabric varying in width previously built, rolled accurately to shape, and semi-cured—that is, partially vulcanized. The clinch is immersed first in rubber solution and is then fitted as shown with a diagonal overlapping joint. When in place, the second fabric layer is turned up over the clinch as seen at F and then with a roller knife the workman trims it to half the depth of the bead as at G.

According to the size of the tire to be made, varying numbers of layers of fabric are used. That applied after the insertion of the clinch is cut so that when finished the overlap at the bead matches the reverse overlap we have seen at G, Fig. 3. The completing layers of fabric are carried right to the inner edges of the tire beads. The fabric foundation being complete, the cushion stock, as the tiremakers call the first rubber layer, is put on. The neck of the section is first covered with the narrow pure gum strip H, Fig. 4, and then the wide rubber sheet I is laid and rolled into place. The rubber used to this stage of the construction is as pure as possible.

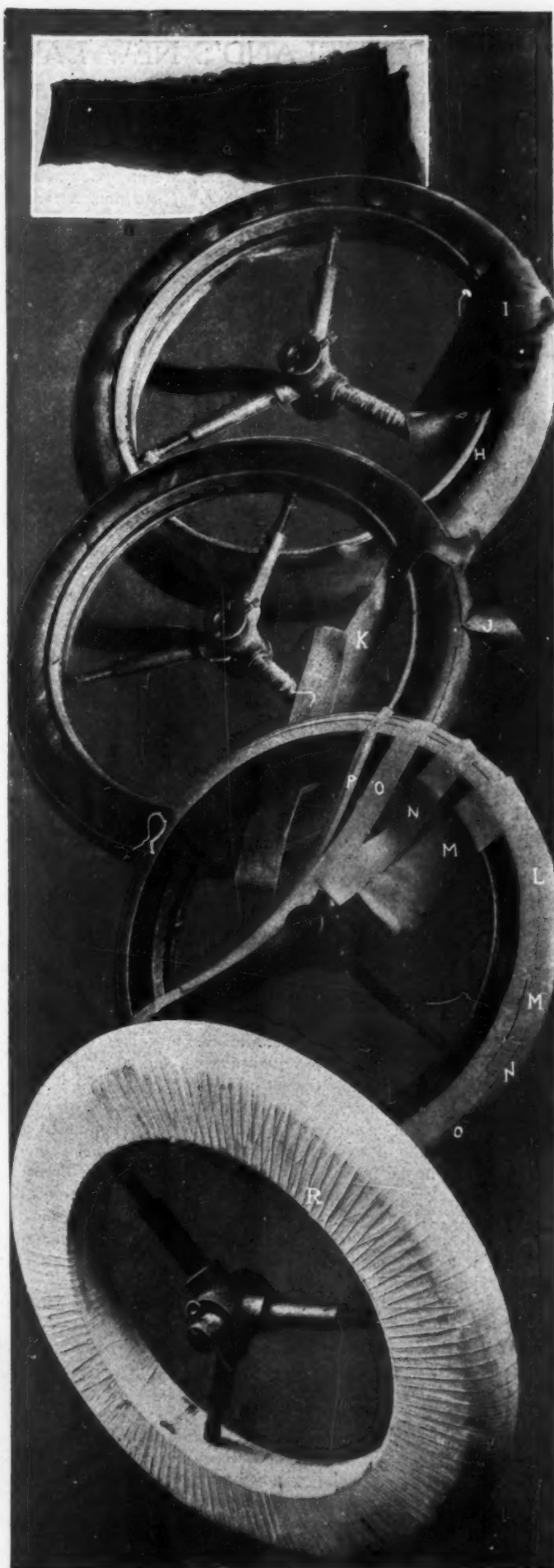
Having laid the "cushion" stock, the "breaker" strips, J and K, Fig. 5, are applied. These consist of rubber-impregnated fabric of coarser weave than the material used in the foundation, but cut so that the direction of the warp of the material is along the tread of the tire instead of diagonal to it as with the fabric used in the building of the carcass. Strip J, Fig. 5, is finer in weave than strip K, but each aids the other in providing strength for the tire in the direction of its future motion. Functionally, the breaker strips are used to reduce the strain on the tire body. The joints in both breaker strips being duly covered with pure rubber film, the laying of the tread is commenced.

The tread consists of compounded rubber—that is, the pure gum mixed with sulphur and other inorganic materials destined to increase its resiliency and durability—and is built up of strips of varying widths. The tire of the picture uses five to its tread composition, seen variously at L, Fig. 6, completely laid, and in order of decreasing width at M, N, O and P, respectively. Each strip is rolled separately into place and then copiously pricked to permit the escape of any air possibly remaining between the layers during the subsequent curing process.

The tiremakers' task is now nearly complete. The last function of the builder is to clamp on the heavy cast-iron flanges QQ, Fig. 7, and draw them together with bolts. The object of these flanges is to insure the accurate shaping of the bead and to obviate any possibility of distortion or wrinkling of the fabric during the vulcanizing process.

The last step in the constructional operations before ingenious labor makes way for the magic of the chemist is the wrapping of the tread, Fig. 8. This is done by machinery and a wetted cotton bandage R is used, being wrapped radially about the tire form. The drying of the already tightly stretched bandage in the curing chambers causes great pressure to be evenly exerted on the tread of the tire, thus materially aiding in the consolidation of the rubber composing the tire. The vulcanizing or curing process carried on at a high temperature causes each rubber layer to so closely identify itself with that with which it is in contact that it is afterward impossible to trace the lines of coalition.

Owing also to the rubber flowing during the vulcanizing process, the finished product, fabric rubber clinch and tread are homogeneously and inseparably welded together in a permanent bond.



RHODE ISLAND'S NEW LAW PRETTY NEAR "THE LIMIT"

PROVIDENCE, June 30.—With the avowed object of securing the protection of the motorists in Rhode Island by securing the enactment of just laws governing the use of the highways by all vehicles, and to prevent, by legal means, discrimination against users of motor vehicles and their unjust prosecution, a second association of automobilists has been formally effected in this city. The officers of the new league are George H. Huddy, Jr., president; J. S. Gettler, secretary, and George C. Arnold, treasurer. Mr. Huddy is the assistant United States district attorney.

The organization of the league was the outcome of the new law passed a few weeks ago in this State, in which the owners of automobiles were taxed according to the horsepower, and the entire matter of licensing the machines was taken from the Secretary of State and placed in the hands of the State Board of Public Roads.

It is about as unpopular a bit of legislation with the drivers and owners in this State as has been passed in New England.

The law was framed by members of the General Assembly, largely composed of members from the rural districts, and in spite of strenuous objections from owners of cars in this and other cities features were incorporated which it is believed are unconstitutional.

Heretofore certificates of registration and numbers for the machines were issued by the Secretary of State upon the payment of a nominal fee, but it was argued by the members of the General Assembly, a majority of whom are from towns in which there are few resident owners of automobiles, that the fast-driving of the cars was the cause of destroying the macadam roads. They urged that the larger and more powerful the car the greater was the damage, and incorporated in the law not only a speed limit of 15 miles an hour, but also provided that each car should be taxed in proportion to its horsepower.

The entire matter was placed under the jurisdiction of the State Board of Public roads, with instructions to the owners of automobiles to take out new licenses and secure new numbers.

This many of the owners have thus far neglected to do, and the State Board of Public Roads has already sought the assistance of the police in the several cities and towns to aid them in enforcing the law.

At a special meeting of the Rhode Island Automobile Club for the purpose of discussing the new law, Colonel Frank W. Tillinghast, a prominent attorney and himself an enthusiastic automobilist, expressed the opinion that the registration fee as provided for in the new law should be paid by the owners of the cars under protest. He urged the members of the club to accompany the registration fee with a written protest, so that the money would be returned in case the test case which is now before the court, should result in upholding the contention of the owners that the law is unconstitutional.

It was the unanimous opinion of those present that if the authorities were to insist upon the wholesale "honking" of horns at every cross street it would become such a great nuisance that the public would rise up and protest. These horn regulations have been branded as unreasonable and obnoxious, and it was the general opinion of those present at the meeting that the drivers of the machines should run their cars so that there would be no necessity for constant "honking" and clanging of bells.

The test case to try the constitutionality of the new law was begun when a deputy sheriff served the members of the State Board of Public Roads with writs in the case of Jefferson K. Crafford, who has filed a petition with the Supreme Court for a writ of mandamus, ordering the board to furnish him with a certificate of registration for his automobile.

The case is backed by the Rhode Island Automobile Club and arose through the refusal of Mr. Crafford to pay the registration fee of \$15 to register his automobile. The test case will be watched with interest, as it questions the constitutionality of the new law in many features, particularly on the ground that it imposes double taxation.

RECENT CHANGES IN MASSACHUSETTS AUTO LAW

BOSTON, July 1.—Automobilists or motor cyclists who contemplate touring in Massachusetts on or after the 12th of this month should take into account the new law which was passed by the legislature recently adjourned, and which goes into effect on that date. While the act makes no very radical changes in the motor vehicle laws, it does make certain changes of which tourists should be aware. Two new punishable offenses are specified, and the power of the highway commission is much strengthened in the matter of suspending and revoking licenses. The act was originally drafted by the Safe Roads Automobile Association. After being heard by the committee, certain changes were made at the suggestion of the highway commission, and the bill was much mulled over in the committees, being passed only during the last day or two of the session.

To autoists from outside the State, who are just now coming into Massachusetts in large numbers, a section of the new law is particularly important. The non-resident who has complied with the laws of his home State may still drive in Massachusetts seven days without taking out a Massachusetts registration. He must, however, drive himself, as the law does not make provision for the operation of such a car by a chauffeur. But if a non-resident driving in Massachusetts during the seven days' limit is convicted of violating any provision of the automobile laws, whether or not he appeals, he must thereupon have his car registered here and secure a license, thus placing his car and himself under the jurisdiction of the Massachusetts highway

commission. The courts are required to send records of the convictions of non-residents to the highway commission.

The new law enlarges the powers of the highway commission in several directions, most important perhaps being the provisions which constitute the commission an investigating body in relation to accidents. It is specifically provided that the commission may summons witnesses, administer oaths and take testimony, thus making it to all intents and purposes a court. Whenever the death of any person results from such an accident the commission is required forthwith to suspend the license of the operator, and must revoke the license, unless, upon investigation or after a hearing, it determines that the accident occurred without serious fault upon the part of the operator. If a license is revoked it cannot be renewed for at least six months.

Another change in the law of interest to automobilists made by the legislature which has just adjourned is the putting on the statute books of the law of the road. This law reads: "Whenever on any bridge or way, public or private, there is not an unobstructed view of the road for at least 100 yards, the driver of every vehicle shall keep his vehicle on the right of the middle of the traveled part of the bridge or way, whenever it is safe and practicable so to do." The penalty is a fine of \$20 and liability in an action commenced within twelve months of the violation. The legislature also passed a law for the codification by the highway commission of the automobile laws, the commission to report the 1st of next January.



One of the Beautiful Boulevards of the City of Los Angeles, Cal., That Has Been Treated by the Petrolithic Process.

IN the first of these articles I showed how Washington and Oregon are solving the problem of ways and means. In the second I showed how California is solving it. In this I will try to indicate something of the progress which California has made in methods, and how California, in my judgment, is going to give the world new lessons in road construction, so that when that international congress which has been called by the government of France shall meet, and the United States is asked for its report, California may arise and say, "Eureka!" And so all the rest of the nations may concede that California has found it.

The first innovation, to which I shall refer but briefly, relates to the paving of city streets where the traffic is the heaviest, and where hitherto no construction has been devised which shall be adapted as well to the needs of the heavy dray as to those of my lady's automobile or the children's pony cart.

A gentleman of Los Angeles has invented a process by which he hopes to take a soft, common brick, the cheapest kind we now use in building houses anywhere, and convert that brick into a hard, tough, durable unit which, when laid in a pavement, shall make a homogeneous street covering which will not crack, will not crumble, will not rot, but which at the same time will furnish a sure footing for horses, be resilient beneath their feet, and will be the ideal pavement for an automobile.

It seems incredible, I know; but months ago there was laid upon the busiest streets of Los Angeles, where the teaming is heaviest, ten feet of a sample pavement constructed with brick of this character, and, so far as I could judge, the brick has made good. That brick is not on the market. Its inventor has refused to give me particulars, saying, "We are not ready. There is much for us yet to learn. We are satisfied we are on the right track. While I should be delighted to have you the first to tell the world of this wonderful invention, I can only give to you such facts as any man may gain without any assistance from me."

The rest of this article will have to do with a method of road building which, in my judgment, will, when absolutely and finally perfected, meet every requirement for street or road service, from that of a street of heaviest traffic to a country road.

The limitation of this process will be climate. Where the line will be drawn, no one can yet say. The process involves the mixture of a mineral oil, carrying a high

percentage of asphalt, with the natural soil of the road surface, and the tamping of this intimate mixture by an apparatus known as a tamping roller which has projecting prongs, each one of which, as the roller is drawn over the road surface, in its turn enters the loose soil and tamps it down, as the feet of sheep tamp the ground whenever a flock of sheep passes over it. The surface of this road will be made in cases of the natural soil of the region. In other instances, it will be a layer of extraneous material.

The origin of this method was in Kern county in this State. I learned of it in 1902, when I was preparing my paper afterwards published by the United States Department of Agriculture under the title "The Use of Mineral Oil in Road Improvement." I did not get a chance to see one of the rollers, and of course I did not witness its operation; and hesitating to write of what I had not seen, I did not mention it in my paper.

The eminent civil engineer, H. P. Gillette, whose works on several engineering subjects have become classic reference books for the profession, himself an enthusiastic road expert and road authority, saw the importance of this before I recognized it; and he induced his father, T. W. Gillette, to look into it. T. W. Gillette was my old co-worker in the Northwest. Years ago, when chairman of the Board of County Commissioners of Whatcom County, Washington, he led the movement for highway betterment in that county which resulted in making Whatcom county, Washington, at one time the most famous county for its roads in the United States.

It required courage in those days to use the people's money to construct roads through the bog holes and swamps of that section, where the roads had been so soft that they would mire a saddle blanket, and where it had been supposed that nothing but a plank road would float upon the waves of mud. But Mr.

Gillette is a man of great tenacity of purpose as well as foresight. He was quicker than his associates to see what Whatcom county must have, and almost at the risk of his life he forced them to join him in that enlightened policy, which later made Whatcom county so illustrious.

Mr. Gillette, then and now president of the Fairhaven Water Company, spending part of his time in Whatcom county, Washington, and the rest at his beautiful home in Pasadena, induced to join him a number of gentlemen of wealth



Slauson Avenue, Southern Boundary of Los Angeles.

Road made by petrolithic process on natural sandy soil, suggests the solution of the Florida problem, where similar conditions exist.



Orange Grove Avenue, One of Los Angeles' Beauty Streets.

and large view who were satisfied to accept the judgment of himself and his emirent son. They organized what they called the Petrolithic Pavement Company, the name being derived from two words meaning petroleum and rock.

With unfailing patience and unswerving purpose, they have worked at this problem. There was a vast deal to learn. Little was known definitely about mineral oil. While some oils were valuable, other oils were nearly worthless. Little was known about how substitutes for natural asphalt oil could be obtained. Little was known about the effect of oil in road-making, outside of California. Up to date, these men, engaged upon a work of universal beneficence, have found the balance large on the wrong side of the ledger. It will not always be so. If my study of road building in every possible phase for nearly forty years has been sufficient to justify me in forming a reliable conclusion, this petrolithic pavement road, when finally perfected, is to be the most satisfactory roadway for mankind.

That epigram of the ancient Romans, "Ad astra per aspera," receives a new confirmation in the experience of every great, successful enterprise. This is the lesson these gentlemen have been learning from contractors of differing grades of honesty and intelligence, the puzzling vagaries of nature in producing oil, the physical laws of road material, and the varying climates of widely separated localities. There is much yet to be learned. There is much known to-day which was not known a year ago. There is much yet to be done before the inertia of ignorance and habit among men has been finally overcome.

In California the battle has been practically won. That Pasadena boulevard which a year ago was an abysmal morass, is to-day, as I have said, the best road I have ever seen; and it is



Street in Monrovia, Cal., Improved by Petrolithic Process.

the best because it is a petrolithic road. The most interesting feature of it perhaps is that it did not cost more than a quarter of what a stone covered road would cost.

In a bend of that road, where the flying squadron of automobiles from Los Angeles meets the flying squadron coming from Pasadena, and where each is obscured from the sight of the other by an intervening slope, there was recently a sign which bore the legend, "Please slow down here to seventy miles an hour." A few days ago I went out with my camera to preserve that realistic feature of the landscape, but I found myself too late. It was gone, and I was awfully disappointed. It is true that automobiles do fly over this road at seventy miles an hour, but it is fair to assume that they generally get down to at least thirty when rounding this curve. In the interest of a common humanity, let us hope so.

The autoists tell me that nowhere else in their experience have they ever ridden over a road so satisfactory to them or their patrons. Neither warts nor smallpox have developed upon the surface of this road, but the automobile glides along with a motion suggestive of the Twentieth Century Limited, as smoothly almost as if on a velvet carpet.

Three years ago the town of Monrovia, a few miles east of Los Angeles, began constructing a system of petrolithic streets upon the natural soil which is a disintegrated granite. Those streets are to-day one of the features of interest to the tourist in Southern California. They have had no repairs during the time and they exhibit no signs of wear.

Los Angeles is bordered on the south by Slauson avenue. The natural soil is sand, and on a portion of Slauson avenue has been constructed a petrolithic road. It is ideal, and no road

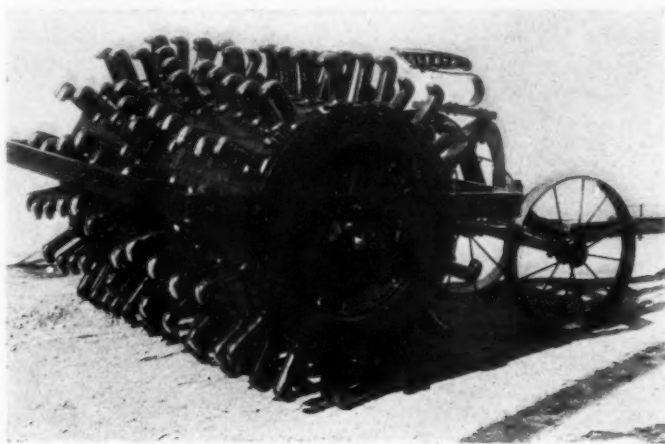


A Typical Bit of Pasadena, Cal.—In the Foreground Are the Homes of Two Directors of the Petrolithic Movement.

builder could see it without exclaiming, "Here is the solution of the Florida problem." Any road builder who knows the character of the sand which overlies most of Florida and who understands the action of asphalt with sand and carbonate of lime, which is more or less abundant in Florida, knows that the sand of Florida would yield better results under the petrolithic process than Slauson avenue has yielded.

West Adams street, in Los Angeles, the most magnificent residence street in that magnificent city, has recently been paved by the petrolithic process, the specifications having been gotten up by Homer Hamlin, the city engineer of that city, and one of the most competent city engineers in the United States. If there is a Barber asphalt pavement in the country which will touch West Adams street in as many of the essentials of a perfect pavement, it has never yet been my privilege to see it, nor have I ever yet seen a Barber asphalt pavement constructed at a cost of 35 cents per square yard, which I am told is more than it cost to pave West Adams street.

Pasadena is *facile princeps* the most beautiful residence city in the world. Here the art of man has taken the handiwork of God and out of it fashioned the most exquisite collection of æsthetic products ever grouped within the boundaries of a single city. What West Adams street is to Los Angeles is Orange Grove avenue to Pasadena, sixty feet wide between



A Tamping Roller Showing the Feet of the Iron Sheep.

curbs, on either side for miles in unbroken succession bower after bower of bewildering beauty.

Before the automobile came, with its wearing effect upon road surfaces, Orange Grove avenue was paved with granite, after the old Macadam method.⁸ Its preeminent function has always been to feed and clothe the watering-cart man and his family. At certain hours each day the automobiles which sweep along that avenue have distributed impartially upon the just and the unjust a shower of mud. During all the other hours of each pleasant day this street material in varying degrees of desiccation is whirled up in clouds, which the wind, blowing where it listeth, generally lists to drive into the faces of all the people who pass up and down the avenue.

The emancipation of Orange Grove avenue awaits the petrolithic process. It will be a hard blow to the watering-cart man, but I think there will be much compensation in the absolute freedom thereafter from the showers of mud and the whirlwinds of sand which have hitherto been such a destructive plague upon fine raiment and the countenances of human beings.

If the Los Angeles County Highway Commission does not make a comprehensive use of the petrolithic process in the roads they are going to construct, I shall be very sorry for them after they have experienced the effect of public sentiment.

The Petrolithic Pavement Company has thus far made no attempt to do anything in the East. When they get ready to invade New Jersey there will be something doing, as your readers who ride in motor cars will discover. Although their operations

have been confined largely to California cities, of which nearly forty have already had the benefit of this process, so insistent has been the demand from outside points that almost in spite of themselves the breastworks have been advanced to Louisiana, Florida, Cuba and even to Rio de Janeiro, Brazil, and I do not hesitate to predict that in the not distant future he who attempts to follow the petrolithic flag will find that, like the flag of Great Britain, it will lead him around the world.

I beg to say in this connection that I have not a cent's worth of interest in the petrolithic pavement, and never expect to have; that my interest in the cause of good roads solely has led me to take this interest in what I conceive to be the most important event in road construction since the days of Macadam; and I beg to say that it has been only at considerable financial loss that I have done it. Like all my other experience in road work, it has been at serious personal sacrifice.

This may be the last article I shall ever write on the road subject. It is my present determination that that shall be the case. But I am very glad that it has been permitted to me to make my final message, as I believe, so important to mankind

ROAD EXPERIMENTATION IN MASSACHUSETTS.

BOSTON, July 1.—To the Commonwealth of Massachusetts with its more than 700 miles of improved State highway and its nearly 14,000 registered automobiles, to say nothing of thousands of visiting machines constantly using the roads, the problem of maintenance and preservation has assumed a serious aspect and the Highway Commission is casting about for some effective means of preventing the rapid deterioration of the fine stone highways which stretch from one end of the State to the other.

The problem of road maintenance in Massachusetts is complicated by the numerous and varied conditions that are encountered, ranging all the way from the steep grades of the Berkshires to the sand of Cape Cod.

The most interesting experiment that has yet been undertaken is that which is just about to be started by the commission and the town of Hamilton. This is the construction of a dustless highway, the contracts for which have already been let. It is proposed to tear up a strip of much traveled road and to build it over from the bottom course to the top. The bottom course will be laid as in the ordinary macadam road of stone crushed to the proper size. This will be rolled hard. There will then be applied a course two inches thick of stone which has previously been treated with tar. This will be spread on and rolled solid. Upon the top will be placed a thin layer of tar. The top layer is considered the most important of all, for it is not desired to build a tar concrete but rather a stone road with sufficient tar to bind it and give a smooth surface.

Another interesting piece of work is about to be started on Cape Cod between Chatham and New Orleans, where there is no stone to speak of and where the road must be built entirely from sand. Here a Texas asphalt oil is to be used. The sand road will first be shaped with a road machine. Over the surface the oil will be spread hot. After the first coat has been on two weeks the second coat will be applied. Then the surface will be cut up with a disc harrow so as to mix the sand and oil to a depth of four inches. Then the road will be rolled and thin sprinkling of sand put on to take up the surface oil. The commission did a little work of this kind two years ago and it proved so satisfactory that it has been adopted for use on the Cape, where there is not material for stone roads. On the piece originally built in this way the results have been excellent, a good, firm road resulting, which has stood up under the wear better than was anticipated.

A third new method that is being tried is the application of thin coal tar. In the town of Marlboro two contracts have been let to parties making proprietary coal tar preparations. One applies the tar cold and the other applies it hot. The stone road is first swept, then the thin tar is applied and brushed in, after which the sweepings are put back to form a surface.

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The Class Journal Company, publishers of "The Automobile,"
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AUTO ENGINEERS A GROWING BODY.

Nothing has served to show more strikingly the wide-spread interest in the movement for the fostering of independent engineering investigation in the automobile field than the success which attended the holding of the third annual summer meeting of the Society of Automobile Engineers at Detroit during the latter half of last week. Although this infant engineering organization can already claim an age of three years, which though little in other fields of endeavor, is a considerable lapse of time when measured by the rapidity of progress in the automobile field, it has suffered during the greater

part of its existence from having had its light hidden under a bushel. The fact that there was such an organization in the industry only needed to be known to attract to its support the majority of the leading engineers and designers, and immediately the fact was made known that the Society also welcomed to its ranks the technical men of the accessory and allied interests the increase in its membership has been very rapid.

The possibilities for good that are bound up in such an organization, both to the industry as a whole and to the individual engineers themselves, need hardly be dwelt upon. As evidence of what can be done by proper methods and a wise administration, the dean of engineering bodies in this country, the American Society of Mechanical Engineers, need only be cited. Although it has required many years for the latter organization to arrive at its present position of influence and authority in the mechanical field, the future that lies before the Society of Automobile Engineers is not less bright and its development is bound to be many times as rapid, not alone owing to the great rapidity with which things progress in the automobile industry, but also owing to the fact that conditions generally are vastly different.

With a view to insuring the greatest attendance with the least inconvenience and of procuring all possible facilities right at hand for the furtherance of its investigations, it is the policy of the Society to hold its meetings in automobile manufacturing centers, barring the annual meeting, which, under its constitution, must be held in New York, and there is every prospect that the third quarterly meeting for 1908, to be held in Cleveland, will be fully as successful as its predecessor.



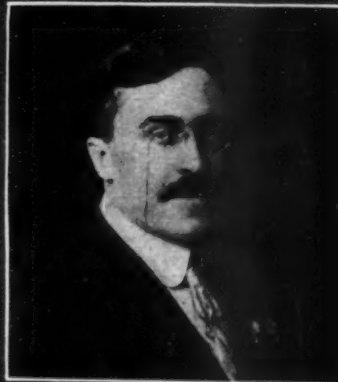
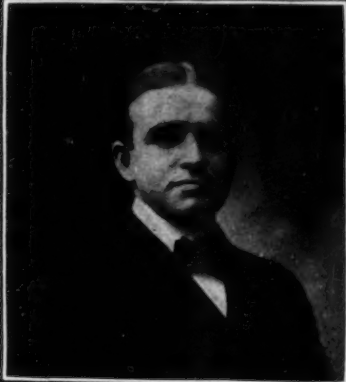
STUDYING THE TRANSMISSION PROBLEM.

For the present, at least, it may be conceded that the matter of motor design and construction has been brought to a fairly well established point of standard practice. True, there are numerous standards, but barring revolutionary discoveries, improvement will follow the lines of detailed refinement rather than radical departures from types now current. This being the case, the problem of working out the most efficient method of transmitting the power from the motor to the rear wheels appears to be the most important item of design that now confronts the automobile engineer. Naturally, many consider that this has already been solved, and to a certain extent this is the case. The tendency in recent years has been toward the adoption of what has been aptly termed the "transmission axle" on one hand, while on the other the motor and gear-set are one.

A moment's consideration suffices to show that both types embody numerous advantages and that in many instances those of one are lacking in the other. Herein lies the difficulty, for it is a matter of common knowledge that it has thus far been found practically impossible to reconcile designers on such points as the dimensions of main bearings, even where their standards differed from the other fellows' by sixteenths, or sometimes even sixty-fourths of an inch. The transmission axle permits of the use of a single universal and a long driving shaft, but it brings considerable unsprung weight on the rear tires, and the advantages of the motor and transmission unit type are likewise counteracted by disadvantages, so that the problem calls for much study.

NATIONAL COMMITTEE OF THE AMERICAN AUTOMOBILE ASSOCIATION

Good Roads Legislative Convention
at Buffalo, New York
July 7-8-9, 1908
National Grange



Hon. Charles Thaddeus Terry, New York.
Chairman, Legislative Board, American Automobile Association.

Robert P. Hooper, Philadelphia.
Chairman, Good Roads Board, American Automobile Association.

Frank B. Hower, Buffalo.
Chairman, Touring Board, American Automobile Association. President Automobile Club of Buffalo.

Hon. James H. MacDonald, Hartford.
President American Road Makers Association.

W. H. Hotchkiss, Buffalo.
President American Automobile Association.

Ex-Governor N. J. Bachelder, Concord, N. H.
Master of National Grange.

Alfred Reeves, New York.
Representing the American Motor Car Manufacturers Association.

F. H. Elliott, New York.
Secretary, American Automobile Association.

S. D. Waldon, Detroit.
Representing the National Association of Automobile Manufacturers.

"GOOD ROADS AND UNIFORM LEGISLATION"—THE CRY

EVERYTHING points to a momentous gathering of automobilists and highway improvement apostles at Buffalo July 6, 7 and 8, on the occasion of the American Automobile Association's Good Roads and Legislative Convention. Not only clubs, but State divisions are organizing tours. Each day brings advices of additional delegates appointed by Governors of States, highway boards and clubs.

"Good Roads and Uniform Legislation" is to be the slogan. The battle cry quoted will be seen in red and white lettering on thousands of blue pennants made for the occasion, with the emblem of the American Automobile Association in the center.

The committee is now finding it difficult to keep the program down to proportions practicable for the time allotted, as the list of speakers and demonstrators has been steadily increasing.

Additional delegates from Western States appointed by the State executives are: By Governor John C. Cutler, of Utah, Hon. D. R. Roberts; by Governor Henry A. Buchtel, of Colorado, Dr. F. L. Bartlett, E. A. Coleburn, G. H. Fernald, George E. Hannan, J. Harvey Nichols, Jr., A. T. Wilson, W. S. Hunnewell, E. L. Mathewson and D. M. Howell.

In addition to the delegates from sixteen other States, various clubs have so far notified the committee that they will be represented as follows:

Automobile Club of Hartford, Conn., Walter S. Schutz.
Automobile Club of Southern California, Los Angeles, Charles B. Hopper.

New Jersey Automobile and Motor Club, Newark, Paul E. Heller, J. H. Wood, chairman good roads committee, and F. A. Crossel-mire.

Automobile Club of Springfield, Springfield, Mass., Mark Aitken, A. E. Lerche, M. T. White and S. L. Haynes.

Elyria Automobile Club, Elyria, Ohio, A. L. Stark, W. N. Gates and A. L. Garford.

Automobile Club of St. Louis, Mo., Roy F. Britton and Sam D. Capen.

Automobile Club of Wilkensburg, Wilkensburg, Pa., Dr. W. R. Stephens, A. J. Puffinburg and Dr. W. C. Cook.

Automobile Club of Philadelphia, Powell Evans, W. O. Griffith and S. Boyer Davis.

Quaker City Motor Club, Philadelphia, A. T. James, Edwin A. Lewis, Dr. W. J. Donnally and L. E. French.

Chicago Automobile Club, T. J. Hyman, Claude Seymour and A. R. Stumer.

Automobile Club of Bridgeport, Bridgeport, Conn., S. T. Davis, Jr., and A. L. Riker.

Wilkes-Barre Automobile Club, Wilkes-Barre, Pa., Dr. E. C. Wagner and W. L. Raeder.

Malden Automobile Club, Malden, Mass., A. E. Bliss, A. B. Tenney and C. P. Price.

Automobile Club of Washington, Washington, D. C., Robert B. Caverly, John K. Heyl and William D. West.

Norristown Automobile Club, Norristown, Pa., Edwin S. Nyce, Fred M. Jacquith and John E. Mountain.

Automobile Club of Pittsburg, Edward Kneeland, John C. Bragdon, Paul C. Wolff, Edward J. Kent, M. F. Leslie and S. A. Stewart.

Automobile Club of Germantown, Germantown, Pa., Mark Reeves, Charles H. Thompson and C. H. Wheeler.

Cleveland Automobile Club, W. C. Baker, H. L. Vall and W. P. Murray.

Automobile Club of Franklin, Franklin, Pa., John A. Wilson, Charles Gearing and C. E. Trace.

Automobile Club of Vermont, Springfield, Vt., Charles C. Warren, James M. Boutwell, W. D. Woolson and W. W. Brown.

Brockton Automobile Club, Brockton, Mass., Henry R. Burbeck, Rochester Automobile Club, H. C. Strong, W. C. Barry, Jr., F. E. Mason, John W. Breyfogle, W. H. Campbell and Bert Van Tuyle.

Long Island Automobile Club, Frank G. Webb, Alfred Wilmarth and Russell A. Field.

Automobile Club of Kansas City, Kansas City, Mo., George M. Hawes and L. R. Moore, Jr.

Mt. Vernon Automobile Club, Mt. Vernon, N. Y., William Adams, Franklin A. Merriam and Mark D. Stiles.

Cities, towns and villages will be officially represented by appointed delegations, and the good roads flag will fly from every automobile, every hotel and hundreds of buildings in the Bison City, while the streets will swarm with men wearing the emblem of the A. A. A. convention.

It can safely be prophesied that the convention will mark the beginning of a historic epoch in the fight for uniform legislation and the battle for improved highways in this country.

HARD STRUGGLES AHEAD FOR A. A. A. TOUR TROPHIES.

ONE week from to-day the fifth annual reliability run of the Automobile Association will start from Buffalo. Indications point to a list of participants very close to that of last year, despite the doubling of the entry fee and that the contest for the Glidden and Hower trophies will be fought more fiercely than ever before. This is especially true of the Glidden contest, in view of the fact that the club teams this year will be almost universally made up of trios of individual makers, thus adding more destructive trade rivalry to the struggle.

Entries will close to-morrow with Chairman Frank B. Hower, at Buffalo. In past years the bulk of the nominations came with the closing day's mails. Mr. Hower says that from the assurances of entries he has had from makers, many of which have not yet materialized, he is confident that history will repeat itself this year. The entries given out by the touring board chairman up to the close of last week are nearly up to the number received at the corresponding date last year.

Recent nominations for the Glidden trophy embrace J. F. Duryea, Stevens-Duryea; I. H. Page, Stevens-Duryea; C. H. Foster, unnamed; Frank H. Nutt, Haynes, and Loring Wagoner, Haynes.

The following officials will assist Chairman Hower in the conduct of the tour: Dai H. Lewis, secretary of the A. A. A. Touring Board, in charge of the confetti and pilot car; E. L. Ferguson, starter; Mortimer Reeves, checker at the finish, and in charge of night controls; F. D. Stidham, chief of observers; H. D. Herr, hotel arrangements; David E. Hoag, M.D., official surgeon; Arthur Jervis, press representative; W. L. Conklin and W. A. Carroll, watchers.

Charles J. Glidden, the donor of the trophy bearing his name, will, as usual, be on the tour. Mr. Glidden will be the guest of Mr. Hower, and will ride in his car, starting every morning half an hour before the first contestant and setting an even pace. No contesting car will be allowed to pass the chairman's car.

MANAGER MILES IS HOMEWARD BOUND.

S. A. Miles, general manager of the N. A. A. M., is expected to return from his European tour between the 8th and 10th, in time to attend the preliminary meeting on the allotment of spaces for the Chicago Show, which will be held at the headquarters of the National Association, New York City.

NEW YORK TRADESMEN TO PROMOTE RACES.

It is reported that some New York tradesmen are to form an organization for the promotion of races on various tracks in the metropolitan district. It is believed that the Briarcliff committee, made up of the entrants in the last contest, will be the nucleus of the new race-promoting body.

HOTCHKISS APPOINTS COMMITTEE ON FOREIGN AFFAIRS

THE most important development of the week in the A. A. A. racing situation is the announcement that President Hotchkiss has appointed a special committee, the members of which are now in Europe, and practically all of whom will witness the Grand Prix race at Dieppe, France, on July 7. The aim of this committee will be to clearly define the position of the American Automobile Association through a properly accredited delegate, who will appear before the International Association of Recognized Automobile Clubs at the coming Ostend meeting.

The following official statement from A. A. A. headquarters, which is appended, is self-explanatory, and fully covers the phases of the question involved:

To the end that governing bodies abroad may be accurately informed as to American conditions and concerning the standing of the American Automobile Association as the national governing body both in racing and as the central organization for the dissemination of touring information, the procurement of proper motor legislation and the promotion of the present movement for good

roads, President Hotchkiss of the American Automobile Association has appointed a special Committee on Foreign Affairs, composed of William K. Vanderbilt, Jr., Jefferson DeMont Thompson, A. G. Batchelder, S. A. Miles and Robert Graves. All of these gentlemen will be in Europe this summer and most of them will attend the Grand Prix race at Dieppe on July 7. Indeed, it may be possible that after conference in Paris this committee will be represented at Ostend and then officially bring before what is known as the International Association of Recognized Automobile Clubs the exact facts as to our American conditions. Recent advices from Europe clearly indicate that the leading motorists abroad are not acquainted with these facts and thus have been easily misled by interested agents on the ground.

The committee above named has been given large powers, and, it is believed, will make it clear abroad that there is and can be but one national body in the United States; that no single club can be such national body; and that the national body is the American Automobile Association with its twenty-four State associations, its 200 clubs, and its registered membership of 20,000.

June 30, 1908.

FREDERICK H. ELLIOTT, Secretary,
American Automobile Association.

CHICAGO WON'T BE TAIL TO THE NEW YORK KITE

THE Automobile Club of America's little scheme for a chain of allied clubs to help make good its bluff as a national organization and thus give some color to its pretenses to the control of racing in this country, has received something of a setback in the Western metropolis. The Chicago Automobile Club did not fancy a little bit being made a mere loop in the tail of the New York Club's kite and said so most pointedly in the following resolution, which was unanimously adopted by its board of governors:

"Resolved, That the Chicago Automobile Club respectfully declines the invitation of the Automobile Club of America to withdraw from the Illinois State Automobile Association and thereby from the American Automobile Association, and to join with the Automobile Club of America in an effort to control American motor racing."

Winthrop E. Scarritt, former president of the New York club, and a quondam occupant of the A. A. A. presidential chair, an orator of no mean repute in automobile circles, a proverbially persuasive talker, went to Chicago recently and with approved credentials laid before the Chicago Automobile Club a plan to unite with it in an effort to assume the control of racing in this country, as shown by the coming effort at Savannah.

The civic pride of the Chicagoans was a bit touched at the idea of practically acknowledging the New York Club as a leader. The chance to communicate with the European bodies through the New York club's foreign connections did not somehow appeal to them either; hence the foregoing resolutions.

Secretary Sidney S. Gorham, of the Chicago Automobile Club, put the opinion of his fellows in a nutshell when he said: "We declined the invitation of the Automobile Club of America because we felt the interests of motoring would be best served by remaining loyal to the A. A. A. The latter is an independent body for national control of the sport. Just because the Automobile Club of America saw fit to break away from the New York State Automobile Association, and, therefore, the A. A. A., is no reason why the Chicago Club should do so."

The Chicago club, as might be expected, did not see the Americanism, common sense, or logic of the sport in this country being controlled by several, much less one or two clubs, as opposed to government by a national organization of autoists.

It may be interesting and pertinent to note in this connection that advices received from the directors of the American Automobile Association, in practically all of the large cities of the country, including Philadelphia, Baltimore, Boston, St. Louis, Cincinnati, Cleveland, Detroit, Milwaukee, Minneapolis, St. Paul, Pittsburgh, Buffalo and Kansas City, indicate that their clubs are loyally supporting the American Automobile Association and are opposed to any movement like that suggested to the Chicago Automobile Club by the New York organization.

Incidentally, it may be stated, with due authorization that the report that recently found some publicity that an alliance between the New York and Chicago clubs had been consummated was incorrect, the two clubs having merely agreed to grant one another's members reciprocal clubhouse privileges.

TO CONVERT PALACE INTO FAIRYLAND.

A complete surprise is promised in the decorations of Grand Central Palace for the A. M. C. M. A. international show, December 31 to January 7, for which Parisian and American artists are now engaged in making the designs.

"It is a safe bet that the Palace will take on a far more beautiful appearance than ever before," says H. O. Smith, chairman of the show committee. "Decorating schemes have already been submitted and others are in process of perfection that will turn the Palace into a veritable Fairyland. It is our intention to have the Palace show eclipse anything of its nature ever held before. Everything that money and artistic effects can do will be embodied in the next show. We are giving all artists, designers and decorators a free rein, and I expect that this competition will give us the best there is in them."

THOMAS AGAIN LEADS RACE TO PARIS.

Despite the lead of two or three days that the Protos had gained over the Thomas, due to the accident the latter sustained in bumping over unballasted ties, the Americans have again overtaken their German competitors at Omsk, Siberia, according to advices received by the New York Times. But the Protos was caught up with only after a most discouraging struggle, in which everything was sacrificed to make time, the Thomas being driven 19 or 20 hours out of every 24, Miller relieving Schuster at the wheel. On arriving at Omsk, it was learned that the Germans had broken down 30 miles east of Kainsk, 208 miles to the rear. Omsk is 3,408 miles from Vladivostok and 5,872 miles from Paris, and, by arriving there June 29, Schuster has made the run in four days less time than Borghese did in the Itala in the Pekin-Paris last year.

FRANCE ALL AGOG AWAITING THE GRAND PRIX

DIEPPE, June 22.—Dieppe, eighteen days from the race which will attract the attention of the whole world, is a dull city. The triangular set of roads beginning up on the high chalk cliffs just on the edge of the town has been closed to all racing cars and is being jealously watched by gendarmes in order that fast touring cars shall not develop all the power that is in them. According to the official notice sent out by the club and the local authorities all automobiles must travel over this course, capable of speeds of 100 miles an hour, at a rate of travel not exceeding 12 miles in the 60 minutes.

As European drivers would have difficulty in throttling down their speed monsters to such an extent, they have abandoned the course to the army of workmen who, under the direction of the Dieppe municipality, are endeavoring to put the triangular course into a condition satisfactory to the critical Racing Board of the Automobile Club of France. When the club officials came up

last week for their formal examination of the course, they were disappointed—perhaps it would be more correct to say they were vexed—and bluntly told the authorities, who had undertaken to remake the roads, that they were not at all up to the standard. If fine weather continues during the next eighteen days the Dieppe course may be a perfect tarred ribbon of road for a distance of 77 kilometers; if rain falls there will be spots strewn with loose stones and patches which cannot be considered good for speeds of over 70 miles an hour.

Though the Dieppe course has been deserted by every European contestant, America remains on the ground. Every morning around 9 o'clock a big red Thomas flyer slips out of the Grand Hotel garage, picks a way along the fish-strewn pier and crosses over the two wooden bridges spanning the docks. Dieppe is still too nautical to be automobile, and her population is as ignorant of the ways of the benzine buggy as the natives of any fishing

PRINCIPAL FEATURES OF THE RACING CARS ENTERED FOR THE FRENCH GRAND PRIX, JULY 7.

CAR	Drivers	Engine	Stroke H.P.	Car- buretor	Cooling	Ignition	Clutch	Trans- mission	Drive	Wheels	Track	Wheel- base
AUSTIN (England)...	Moore Brabazon. Resta..... Wright.....	6 cylinders, cast in pairs.	4.9	120	Parallel currents.	Cent'f'l pump, Austin ra- diator.	H.T. magneto	Leather cone.	Sel. slid'g gear, 4 speeds.	Shaft...	875x105 880x120	52 ins. 107 ins.
BENZ (Germany)...	Hemery..... Hanriot..... Erbe.....	4 cylinders, in p'rs, dome heads, valves at 45°	6.4	110	Perpend. currents.	Cent'f'l pump, honeycomb radiator.	H.T. Bosch magneto.	Leather cone.	Sel. slid'g gear, 4 speeds.	Side chains.	880x120 880x120	52 ins. 108 ins.
BRASIER (France)...	Thery..... Baras..... Bablot.....	4 cylinders, in pairs.	6.6	120	Converg. currents.	Cent'f'l pump, tubular radiator.	L.T. Bosch magneto.	Leather cone.	Sel. slid'g gear, 3 speeds.	Side chains.	870x90 880x120	52 ins. 107 ins.
BAYARD-CLEMENT (France).....	Rigal..... Gabriel..... Hautvast.....	4 cylinders, in p'rs, dome heads, sin- gle overh'd camshaft	7.2	120	Bayard- Clement.	Cent'f'l pump, honeycomb radiator.	H. T. Bosch magneto.	Metallic disc.	Sel. slid'g gear, 4 speeds.	Shaft.	870x90 880x120	50 ins. 105 ins.
FIAT (Italy).....	Lancia..... Nazzaro..... Wagner.....	4 cylind'rs, in p'rs, dome heads, sin- gle camshaft.	6.8	123	Perpendic. currents.	Cent'f'l pump, honeycomb radiator.	L. T. Bosch magneto.	Metallic disc.	Sel. slid'g gear, 4 speeds.	Side chains.	870x105 880x120	50 ins. 107 ins.
GERMAIN (Belgium)	Degrais..... Roch-Brault..... Perpere.....	4 sep. steel cylin- ders, copper jack- ets, valves oppo- site sides.	6.6	120	Single noz- zle, with- out ad'nal air.	Cent'f'l pump, honeycomb radiator.	H. T. Bosch magneto.	Expand. metallic	Sel. slid'g gear, 3 speeds.	Side chains.	870x90 880x120	52 ins. 119 ins.
ITALA (Italy).....	Cagno..... Fournier..... Placenza.....	4 cylinders, in pairs, dome heads.	6.2	115	Perpend. currents.	Cent'f'l pump, honeycomb radiator.	L. T. Bosch magneto.	Metallic disc.	Sel. slid'g gear, 4 speeds.	Shaft.	875x105 895x135	54 ins. 118 ins.
LORRAINE- DIETRICH (France).....	Duray..... Rougier..... Minchia.....	4 cylinders, in pairs.	6.8	123	Perpend. currents.	Cent'f'l pump.	L. T. Bosch magneto.	Metallic disc.	Sel. slid'g gear, 4 speeds.	Side chains.	870x105 880x120	52 ins. 107 ins.
MERCEDES (Ger- many).....	Salzer..... Poegge..... Lautenschlager.	4 cylinders, in pairs, dome heads.	6.6	120	Perpend. currents.	Cent'f'l pump, honeycomb radiator.	H. T. Bosch magneto.	Lindsay spiral spring.	Sel. slid'g gear, 4 speeds.	Side chains.	870x90 880x120	52 ins. 105 ins.
MOTOBLOC (France)	Courtade..... Pierron..... Garcet.....	4 cylinders, in p'rs, flywheel in centre dome h'ds, over- head valves with single camshaft.	6.6	120	Perpend. currents.	Cent'f'l pump, honeycomb radiator.	H. T. Nilmel- ior magneto.	Metallic disc.	Sel. slid'g gear, 4 speeds.	Side chains.	870x90 880x120	50 ins. 103 ins.
OPEL (Germany)...	Opel..... Joerns..... Michel.....	4 cylinders in pairs.	6.2	115	Converg'nt currents.	Cent'f'l pump, honeycomb radiator.	H. T. Bosch magneto.	Leather cone.	Sel. slid'g gear, 4 speeds.	Side chains.	875x105 880x120	52 ins. 103 ins.
PANHARD-LEVAS- SOR (France).....	Heath..... Maurice Farman. Cissac.....	4 sep. steel cylin- ders, copp'r jack- ets, valves oppo- site sides.	6.6	120	Automatic hydraulic regulator.	Cent'f'l pump, honeycomb radiator.	H. T. Nilmel- ior magneto.	Metallic disc.	Selective sliding gear, 4 speeds.	Side chains.	870x90 880x120	50 ins. 103 ins.
PORTHOS (France)..	Stricker..... Gaubert..... Simon.....	6 cylinders, separate	4.7	95	Automatic Porthos	Cent'f'l pump, honeycomb radiator.	H. T. Bosch magneto.	Leather cone.	Sel. slid'g gear, 3 speeds.	Shaft.	875x105 857x105	52 ins. 125 ins.
RENAULT (France)..	Szisz..... Cailliois..... Dimitriewitch...	4 cylinders, in pairs, valves one side.	6.2	115	Perpend. currents.	Copper tube radiator on dash; ther- mo-syphon.	H. T. Bosch magneto.	Leather cone.	Progr's've sliding gear, 3 speeds.	Shaft...	875x90 875x120	50 ins. 105 ins.
THOMAS FLYER (America).....	Strang.....	4 cylinders, separ- ate; valves oppo- site sides.	5.7	80	Perpend. currents.	Gear-driven pump, cellu- lar radiator.	H.T.Eiseman magneto; Atwater K't generator.	Metallic disc.	Sel. slid'g gear, 4 speeds.	Side chains.	875x105 880x120	56 ins. 112 ins.
WEIGEL (England)..	Laxen..... Harrison..... Coleman.....	4 cylinders, one cast'g, d'me h'ds, valves at 45°.	6.6	120	Parallel currents.	Cent'f'l pump, honeycomb radiator.	H. T. Bosch magneto; stor. bat'ries	Leather cone.	Sel. slid'g gear, 3 speeds.	Shaft.	880x120 880x120	56 ins. 111 ins.
MORS (France).....	Jenatzy..... Jarrott.....	4 cylinders, separate over- head valves.	6.6	120	Automatic	Tabular radiator gear driven pump.	L. T. Mors magneto.	Leather cone.	Progr's've sliding gear, 3 speeds.	Side chains.	815x105 895x135	49 ins. 102 ins.

hamlet in wild Brittany. Generally, when the big red Thomas—or any other car, for that matter—emits its first honk at the beginning of the narrow bridge, half a dozen tugs of war immediately commence between as many pairs of mariners engaged in transporting a heavy basket of fish. Sometimes it is a baby carriage containing one speck of humanity and some of the products of the briny that obstructs the way when the first honk goes forth. Then it is a struggle between the half dozen relatives as to which side of the road shall be closed. The men will pull to starboard, the women will pull to port, while the baby threatens to fall overboard. A loud roar of laughter from Strang at the wheel of the immobilized Thomas, and the struggling group, realizing that there is nothing to fear from the big auto, stop to respond with a smile at their own foolishness and fear. The baby is saved, but the next time it meets an auto on the bridge it will be the center of the same scared group.

As there will be no possible chance of the American racing car going on the course until the moment it is given the order to start in chase of the fourteen ahead of it on July 7, Strang has made a practice of going around the course on a touring car from three to four times a day. Certainly the 1908 Grand Prix will be the most keenly contested automobile race the world has ever seen; the cars have been prepared with a greater care than ever before, and the drivers are more highly trained. For this reason alone it is essential to know the course so thoroughly that there will never be a moment when the nature of the stretch ahead cannot be recalled. There is some caution needed in this daily training, for, although there are few cars, there are numerous tar wagons and a few keen-eyed gendarmes at Criel.

Because it is the only car on the road the Thomas Flyer has been frequently called upon to act the rôle of the good Samaritan. One afternoon it was a long-robed priest with his clerical garments pinned around his legs, who was carried back to the garage from an outlying spot on the course, where his motorcycle had suddenly decided to go out of business. Half an hour's patching by the team of mechanics at the garage and the clerical gentleman had scrambled on his saddle and was tuf-tuffing down

the road, after struggling to return thanks in broken English. Next afternoon it would be the village postman, who, for the first time in his life, had a practical experience of how nine kilometers could be covered in nine minutes. On the next round the gendarme himself would plead to be taken home faster than his legs could carry him, or the dignified government gamekeeper would make a sign that he would like to be helped along. None of them were refused.

Although there are no racing teams on the course, practically every firm has secured headquarters either in Dieppe or in the little towns and villages of the neighborhood. Now and again an entire team will run up from Paris on a practice trip, stay a few hours and disappear with a formidable roar. Gabriel, Rigal and Hautvast, who made one of these appearances this week on their Bayard-Clement cars, claim that they have covered the kilometer in 21 seconds, which is equal to the tremendous average of 106 miles an hour. Dury, of the Dietrich team, whose trial trips have been of no less than 500 miles a day, claims about the same period. Szisz, chief of the Renault team, puts in lower claims for speed, but is none the less confident of winning, the three cars being marvels of regularity. Benz, Fiat and Itala are known by the French to be dangerous rivals who might again rob the tricolor of victory.

There is very little doubt but that the speed average of 70.6 miles an hour established last year will be broken next month, providing, of course, that weather conditions are favorable. It will be a remarkable performance to thus break the record, for, under the 155-millimeter rule, the cars have on an average been reduced in bore by one inch. Naturally, under such rules, the stroke exceeds the bore, all the engines, with the exception of the British Weigel and the American, being long-stroke, slow-speed engines. In the voiturette race to be held the previous day, exaggerated strokes are well in evidence, some of the little single cylinder cars, with a bore of slightly less than 4 inches, having a stroke of 7 1/2 inches and an engine speed of 2,200 revolutions a minute. Horsepower is rated anywhere from 14 to 22, and maximum speed is estimated at 55 or 56 miles an hour.

THREE UNBROKEN IN ALBANY RUN.

ALBANY, June 26.—Three of the seven contestants in the six-day endurance run of the Albany Automobile Club, which ended here to-night, completed the test with perfect scores. They were Joseph Taylor, Locomobile; Matthew Van Alstyne, Peerless, and Edward Wright, Elmore. All three competed for the McClure cup with sealed bonnets and evolved with seals unbroken. The Locomobile for the third successive year made the run with a perfect score. Of the seven cars entered, five were from Albany, one from Ballston, and one from Troy.

HIGH-CLASS SPORT PROMISED AT ELKWOOD.

A high-class list of nominations has been made for the Fourth of July meet at Elkwood Park, Long Branch. In the sprint line a five-mile match race is featured with Harry Levey's Hotchkiss, driven by H. J. Kilpatrick; Walter Christie's direct-drive racer, piloted by Joseph Seymour, and E. R. Hollander's Fiat Cyclone, with George Robertson at the wheel.

In the 50 and 100-mile races, included among the entrants are Harry Michener, Lozier; Ralph de Palma, Allen-Kingston; Georges Renault, Mercedes; Maurice Bernin, Renault; Al. Poole, Isotta, and Stewart Elliott, American.

ALFRED REEVES IS NOW OUT OF DANGER.

Alfred Reeves, general manager of the American Motor Car Manufacturers' Association, who was operated upon for appendicitis at St. John's Hospital, Yonkers, last week, is now entirely out of danger. He expects to be able to leave the hospital for his home next Sunday. Later he will go to Lake Mahopac for a fortnight to recuperate.

WORCESTER'S ORPHANS HAVE OUTING.

WORCESTER, MASS., June 28.—The annual Orphans' Day outing was observed by members of the Worcester Automobile Club on Friday last. Only thirty-five cars were secured by the committee, who were consequently greatly disappointed. The date selected was only made known four days in advance, and in addition the dedication ceremonies of the memorial statue of the late Senator Hoar fell on the same day.

The committee, therefore, found it necessary to shorten the trips for the little waifs and to make the cars return and take another load. Because of several collisions during the parade last year, the committee this year had the cars report at the club quarters, and there assigned them to certain orphanages, and after they had got their loads they could go anywhere they cared to, there being no regular route.

NEW YORK CLUB'S "IDEAL TOUR" ENDED.

The survivors of the "Ideal Tour" of the Automobile Club of America, a dozen cars in all, reached New York on Sunday, having covered some 900 miles of road, for the most part in New England. The last day's trip was a jaunt of 102 miles from Waterbury, Conn., through Woodbury, Newtown, Danbury, North Salem, Cross River, White Plains and Yonkers.

Thursday's run was to Portsmouth, N. H., 81 miles. On Saturday the tourists made a 157-mile journey to Boston. At this point they numbered but nine. They were here reinforced, however, by Daniel Daly, Matheson and F. D. Hughes' Ford.

The participants pronounced themselves well pleased with the tour. There is talk of the club's repeating the experiment in the autumn, over a route of similar interest and good roads.

THE FACTORY BEHIND GREAT ARROW.

Under this title, the George N. Pierce Company, of Buffalo, N. Y., have just issued one of the most elaborate and attractive pieces of publicity work that an automobile company has ever undertaken. Descriptions of plants are nothing new—in fact, are all too familiar, but seldom does such a work show the painstaking care and attention that is revealed in this latest effort of the Pierce Company. It is a book measuring 10 by 12 inches, substantially bound in board covers of a dark neutral green, offset by the lighter green and gilt of the title, "The Factory Behind the Great Arrow Car," and the ornament emblazoning the cover. Most of its 70 odd pages are devoted to a description of the new Pierce plant which is a model of its kind. It is situated on the old Pan American exposition grounds and its various buildings are fitting companions to the artistic structures of a more enduring type that were left as a memento of the exposition held in that city during 1901.

The description of the various departments of the factory and its systems is by John Foord and is profusely illustrated, showing most of the important steps in the construction of the Pierce Great Arrow cars. The administration building, power plant, stock rooms, the machine and assembling departments, are each taken in turn and shown in detail, the reader of the work really enjoying the next best thing to a personal visit of inspection, to which the Pierce works are always open. Right up to the very last step in the handling of the car at the works, its placing in the freight car for shipment, is shown and then the remainder of the work is devoted to the Pierce product, with a pictorial introductory showing its evolution from 1901 down to the present.

YALE BOYS TO CROSS CONTINENT TWICE.

Charles T. Crocker, of San Francisco, and M. C. Scott, both students at Yale, left New York on Thursday in a 40-horsepower runabout with the intention of making a round trip to the Pacific Coast before college opens again next autumn.

The car has been especially equipped for the journey. There is one small seat behind for the mechanic, the remainder of the space behind the double front seat being taken up by a large provision box and some extra oil and gasoline tanks. The extra gasoline tanks have a capacity of 70 gallons of fuel and the extra oil tanks have a capacity of 30 gallons of lubricant. Two long boards to be used when the car gets into deep sand or into mud holes are carried on the car, along with several coils of wire rope. The tourists are carrying guns, ammunition and fishing tackle with them, as they expect to do considerable hunting and fishing.

QUAKER CITIZENS GET MORE TAXICABS.

PHILADELPHIA, June 20.—"We are now well launched in our business," said President John C. Hinckle, of the Pennsylvania Taximeter Cab Company to THE AUTOMOBILE representative last week. "With a dozen cabs already at work, we are to get a half-dozen more during the present week, and will have 25 at work by July 15. We are so situated that we can easily increase our equipment with the growth of the business."

The company as now organized has the following officers: President, John C. Hinckle; vice-president, Edward Malpass; secretary-treasurer, William C. Wilson; board of directors, John O. Gilmore, Mahlon Newton, John H. Simons, Claude Bennett.

SWINEHART INCORPORATES IN ILLINOIS.

The Swinehart Clincher Tire & Rubber Company has been granted a license to do business in Illinois, with a capital stock of \$200,000, headquarters to be in Chicago. According to officers of the company no part of the plant is to be moved, but the object is to be able to begin legal proceedings to prosecute the alleged infringement of certain clincher tire patents that the Swinehart Company holds. Similar proceedings have already been started in Cleveland.

ANOTHER TIRE FACTORY FOR AKRON.

AKRON, O., June 29.—The Buckeye Rubber Company has added one more tire manufacturing plant to the many in this now celebrated city of tires in establishing a new factory for the special output of pneumatic tires, the company having decided to extend its business to that line. A building has just been put up adjoining the company's present plant. It is three stories high and 231 feet long by 40 feet wide. It is being equipped with the latest tire-making machinery, and S. S. Miller, the company's superintendent, says that manufacturing will be started in two months. The pneumatic tire to be manufactured will be a standard clincher type and has been made in an experimental way for the last year, being placed on the market in limited quantities. The success of the product led the company to take the present step.

The new factory will be devoted entirely to auto tires. The Buckeye company has its general offices in New York, and it has for some years been manufacturing in large quantities the well-known Kelly-Springfield solid buggy tires. It has been led to take the present step by the vast increase in the automobile tire business, which has been responsible for the great growth of the Goodrich, Diamond, Firestone and Goodyear factories, as well as of the Swinehart, Motz and other Akron makes, all of which have made Akron the chief rubber tire city of the United States. At present the tire plants are running day and night and doing the greatest business in their history, despite the recent setback that caused many other plants to shut down last fall.

CONTINENTAL GIVES PRIZES IN TIRE CONTEST.

What was probably a unique contest in automobilism on this side of the water was held at the salesrooms of the Continental Caoutchouc Company, 1788 Broadway, New York, last Friday. The object was to determine how quickly a damaged tire could be removed and replaced with one of the new Continental "ready-flated" type, such as was used in the Briarcliff race this Spring. It was the first event of its kind ever held in New York City, and the attendance was consequently large. Each contestant was obliged to loosen and remove the demountable rim carrying the tire and place on the wheel in its stead another similar rim with an inflated tire on it, ready to run, this simple operation being all that is necessary with the Continental "ready-flated" equipment. The prize of \$10 was won by R. Piccoli, who turned the trick in 59 seconds, the second prize of \$5 going to Felix B. Faust.

SELDEN TO HAVE A BRANCH IN NEW YORK.

One of the latest comers to the metropolis to be represented by a branch house will be the new Selden car, which is the product of the Selden Motor Vehicle Company, of Rochester, N. Y., and the advent of which caused quite a ripple at the last show in the Garden, owing to the very low price the makers have put upon it. The Selden has been represented in this territory by the Palmer & Singer Manufacturing Company since early in the spring, but the makers have now decided to open a branch of their own, which will be located at 41 West Sixty-third street. For the present, it will be in charge of E. T. Birdsall, the designer of the car and chief engineer of the company.

PAGE COMPANY TO BUILD CARS AT PROVIDENCE.

PROVIDENCE, R. I., June 30.—The Page Motor Vehicle Company, recently chartered under the laws of Rhode Island, will begin operations at once at its headquarters, 288 Dyer street. It is expected that the first instalment of cars will be turned out in about three months. The location of the new plant has just been decided upon, but the manufacturers will not give out the detail of construction at present. The officers of the new company are: President, Dr. O. Fletcher; vice-president, Arthur A. Page; treasurer, Samuel J. Green; secretary, H. B. Vandergrift, the same officers also constituting the board of directors.

WHAT THE AUTO CLUBS ARE DOING JUST NOW

AUTO CLUB AND TEAMSTERS' UNION FUSE.

MINNEAPOLIS, MINN., June 29.—In the hope of securing better roads, the Minneapolis Automobile Club has entered politics. In conjunction with the Minneapolis Teamsters' Union the club will work and vote for the election of men for aldermen who, in the opinion of the club, will help the good road cause. The Automobile club has nearly a thousand and the teamsters 2,000 members. Theodore Wirth, superintendent of the Minneapolis parks, has the distinction of having been the first person elected to an honorary membership of the Automobile Club. He will assist in the good roads campaign.

From now on women will be eligible to membership in the club, action to that effect having been officially taken. The initiation fee of \$25 will be waived, for a time at least. There are fifty women in this city who own automobiles.

Owing to the date for the Chicago hill climb being set for August 14, the tours and contest committee of the Minneapolis Automobile Club has decided to postpone the contest here until a date after the Windy City contest, so that the cars used there may be brought here.

PITTSBURGH CLUB'S TOUR TO BUFFALO.

PITTSBURGH, June 30.—Arrangements have been completed for the Automobile Club of Pittsburgh's run to Buffalo to the legislative and good roads convention. It will start next Sunday morning from the clubhouse, Baum and Deatly streets. Three pilots will precede the caravan, Edward J. Kent, starting at 7 A. M.; Edward Kneeland, at 8 A. M., and W. N. Murray, at 8.30 A. M. The tourists will rendezvous at Silver Creek, three miles west of Buffalo, on Monday, at 2.30 P. M., where they will be joined by the other clubs of Western Pennsylvania so as to enter Buffalo in a body. The route to be taken follows: East Liberty, 0 miles; Zelienople, 30; Mercer, 62; Sheakleyville, 77; Meadville, 94; Saegertown, 102; Cambridge Springs, 110; Erie, 130; Fredonia, 178; Silver Creek, 190; Buffalo, 224.

This division is but one of the three that are being organized by the Pennsylvania Motor Federation.

IN AND AROUND CONNECTICUT'S CAPITAL.

HARTFORD, June 30.—The gymkhana of the Automobile Club of Hartford, which was held at Charter Oak Park in connection with the Hartford Hospital benefit, was a most successful affair. About four thousand were in attendance. Practically all came in motor cars, many of which were very tastefully decorated. There were six events on the program, three for ladies and three for gentlemen. These were run off on the broad lawn under the shade trees.

The autoists of Torrington will soon form an automobile club, and it is expected that definite action will be taken within a few days. As soon as the formal organization takes place the club will make application for membership in the State association and the American Automobile Association.

SALT LAKE CITY AUTOISTS ORGANIZE.

SALT LAKE CITY, June 27.—With every prospect of success and a very good chance of soon having their own clubhouse, local owners have organized the Salt Lake Automobile Club.

Among those present at the meeting were James J. Brosoit, Van D. Spalding, O. W. Powers, O. H. Hewlett, Dr. H. N. Mayo, J. E. Jennings, C. R. Pearsall, R. W. Salisbury, Frank Botterill, Lewis S. Hills, L. B. McCornick, J. Frank Judge, H. A. McCornick, Dr. H. D. Niles, A. C. Ellis, Jr., F. A. Babcock, Jr., L. L. Terry and Joseph Nelson, H. W. Walker, F. C. Schramm and Mayor J. S. Bransford telephoned to have their names added to the list of members.

SPRINGFIELD, MASS., TO HAVE HILL CLIMB.

SPRINGFIELD, MASS., June 30.—The Automobile Club of Springfield has voted to hold a hill-climb over the Wilbraham Mountain road, a distance of only a few miles from this city, some time next autumn. The directors of the club have given the committee in charge carte blanche, so far as expense is concerned, and it is expected to make this test one of the most memorable in this kind of competition.

The Wilbraham Mountain road has but one place that could be called dangerous, and this will be eliminated at an expense of two or three hundred dollars. The grade, which, it is believed, will average about 12 per cent., runs in some places as high as 23 per cent. It will be surveyed at once. The test will be classified according to horsepower and selling price, and valuable cups will be offered as premiums.

THE BLUE GRASS CLUB IS A HUSTLER.

LOUISVILLE, KY., June 30.—The Louisville Automobile Club's president, Pike Campbell, in his monthly letter to the members for June, expresses confidence that by the annual election the club's roster will show 250 members, 37 new names having been added to the roll since April 1. Every effort is being made to add influential men to the roll to assist the club in its campaign against drastic laws and ordinances.

The club has already accomplished much. The toll on the Kentucky and Indiana bridge has been reduced. Holes in the streets have been repaired. Arrests and fines have been averted. The orphans were given their annual ride. How hard the club's officials are hustling may be judged from the fact that during the past month 2,200 communications were mailed from the secretary's office.

PEARSALL BRIDGEPORT ORPHANS' HOST.

BRIDGEPORT, CONN., June 27.—Orphans' Day was celebrated last week by the Automobile Club of Bridgeport giving 100 orphans a ride around the city and suburbs ending at the handsome estate of Thomas W. Pearsall at Black Rock. Mr. Pearsall's large stone garage was profusely decorated with flags, and the children were entertained by a fine collation provided by him. Music on the graphophone was furnished by Mrs. Pearsall. Twenty-eight large touring cars were used in the trip, the ride being in charge of F. W. Bolande, secretary of the automobile club; Ralph M. Sperry, chairman of the contest committee, and Bernhard Setzer. This is the second time that Mr. Pearsall has entertained the orphans in this manner.

ST. PAUL CLUB IS TO AID THE POLICE.

ST. PAUL, MINN., June 29.—By official action and formal resolution the St. Paul Automobile Club has decided to do all it can to stop the reckless handling of automobiles by making each one of its members a monitor, whose business it will be to report and bring about the punishment of offenders of the speed laws. The organization will also do what it can to annihilate the meanest of all automobile drivers—the fellow who, following an accident, turns on the throttle and speeds away. A reward of \$50 for information leading to the identification of every such offender. A reward of \$50 will also be paid for the arrest and conviction of the thief who steals a machine belonging to a member of the club.

FLORIDIANS TO RAISE FLAG ON FOURTH.

DAYTONA, FLA., June 29.—The Florida East Coast Automobile Club will raise its new flag on the Fourth of July. The club has recently spent over \$1,000 in improvements on its clubhouse on the famous Ormond-Daytona racing beach.

BRIEF ITEMS OF NEWS AND TRADE MISCELLANY

The salesmen of the Franklin factory will take their annual vacations July 3 to 20. Immediately after their vacations the Franklin salesmen will go to the factory at Syracuse, N. Y., for the annual salesmen's conference.

Alexander Winton has decided not to allow any chauffeur in the \$2,500 Six-Teen-Six contest to go unrewarded. After the judges have chosen the ten money winners, special additional awards will be made to the remaining contestants. Reports already received indicate that the final records will show some exceptionally fine performances to the credit of the Six-Teen-Six.

Within about two weeks the Speedwell Motor Car Company, Dayton, O., will have completed another spacious shipping warehouse which is now being erected on the spur track which the Big Four Railroad has installed. The new building will be used for a shipping warehouse, and is of concrete and steel construction. It is 200 by 30 feet. The company still employs two shifts of men, and the output for next year, according to General Manager Loomis, will be about five times that of the present year.

According to the K-W Ignition Company, Cleveland, O., the "sun never sets on the K-W magneto," as they have now made shipments to points all over the globe, a number of the machines having been sent to China, India, Japan and the Philippines, as well as to South American countries. The K-W magnetos are enlisting for themselves a host of enthusiastic users in this country from coast to coast, and autoists who have once placed one of them on their cars would never think of again returning to a battery for ignition.

According to his usual custom, Colonel James H. Sprague, of Norwalk, O., who has achieved for himself the title of the "canopy autocrat," will hold open house on the Fourth, and with his customary generosity has extended an invitation for every one in the trade to help him celebrate Independence Day in a much more fitting, if less noisy manner, than is usually followed. The invitation takes the form of a giant cracker, and beside extending a most cordial request to make merry with the Colonel from 2 to 6 P.M. on that day, includes an apt piece of poetry entitled "Smile."

With its last phenomenal victory on Skip-pack Hill, in which it made the unprecedented speed of 74.2-5 miles per hour up a steep grade of 11-5 miles, the Great Chadwick Six won the culminating event of a long line of hill-climbing victories that has seldom been approached either here or abroad. In fact, a careful review of existing records is said to show that the Chadwick's average speed on Skip-pack was faster than has ever been attained previously by an automobile in any hill-climbing contest. In the past month or so the Chadwick stock car has swept away all records, defeating by generous margins all competitors in the four big hill climbs of the year, Wilkes-Barre, Worcester, Cleveland and Skip-pack, in the last named of which a number of famous stock cars and racing machines were beaten by 16.2-5 seconds.

Chairman Frank B. Hower announces that the two pilot and confetti cars selected for the fifth annual A. A. A. reliability touring contest are a six-cylinder Premier "45" touring car and a Reo "20" touring car.

A six-cylinder Premier "45" was used in successfully laying out the 1908 route early in May, last, when the heavy rains, deep mud and rough country roads put the pathfinding party and car to a severe test. The companion pilot car—a Reo "20"—is a \$1,250 model, one of which created the great sensation in the 1907 Glidden reliability touring contest by being the only car of 83 starters selling under \$2,250 which finished with a perfect score, and then made its 500-mile official non-stop dash immediately thereafter, from New York to the Jamestown Exposition, in 23 1-2 hours.

The Renault people intend eventually to occupy the same place in America in the taxi business as they now do in France, where 2,000 cabs are in daily use in Paris streets, while the Renault factory has an order for an additional 1,000 cabs for another Paris taximeter company now forming. London is a close second, with 1,500 cabs in daily use in her streets, and an order already placed for 500 more for a new English company. Paul Lacroix, General Manager of Renault Frères, announces that the Auto Taxicab Company of Chicago, recently incorporated, to use Renault taxicabs exclusively, have placed their first order for 50 cabs. In New York the Motor Taximeter Cab Company, incorporated with a capital of \$150,000, has taken over the entire Renault Taxi Service, heretofore operated by Renault Frères, and has ordered 50 more cabs. They use Renault taxicabs exclusively, two types, 10-14 horsepower, 4 cylinders, and 8-10 horsepower, 2 cylinders, the experience of three years in Paris showing the Renaults are the only cabs that successfully stand the strain.

NEW AGENCIES ESTABLISHED.

The Schacht auto buggy has made its appearance in Philadelphia, D. Applegate & Company, 336 North Broad street, having secured the local agency for the high-wheel vehicle, the first of its kind to be exploited in the Quaker City.

The E. L. Leinbach Auto Company, 2312 Madison avenue, Baltimore, local agents for the Stearns car, have added the Oldsmobile to their list of agencies there, while the Arbee Auto Company, William C. Blome, president, has just opened up in this city. The firm has the Baltimore agency for the Moon car.

Having abandoned its agency representation in Philadelphia, the Matheson Company, of Wilkes-Barre, has been quietly looking around for a suitable location for the establishment of a branch house. The matter was settled last week by the announcement that permanent quarters had been secured at the northwest corner of Broad and Green streets, and that W. Wayne Davis had been appointed manager of the new Quaker City branch.

Since the announcement of the new Chalmers-Detroit car at \$1,500 and the Chalmers-Detroit Forty for 1909, the Chalmers-Detroit Motor Company has renewed contracts and closed up a great many dealers for the coming year. Among those who have signed contracts within the last week are Charles B. Shanks, formerly sales manager of the Winton Motor Carriage Company, who takes Cleveland and northern Ohio; J. H. McDuffee, a veteran auto man, who will handle the Chalmers-Detroit line in Colorado, Wyoming and New Mexico,

with Denver as his headquarters; C. E. Whitten, of Boston, Capital City Garage, of Montgomery, Ala.; The W. L. Hibbard Motor Car Company, of Milwaukee; E. P. Moriarty Company, of Kansas City; Fort Dodge Automobile Company, of Fort Dodge, Ia.; Chas. J. Durham, of Muskegon, Mich.; Newark Garage & Repair Company, of Newark, N. J., and the Barclay Auto Company, of Minneapolis.

PERSONAL TRADE MENTION.

Henry Lomb, one of the founders of the Bausch & Lomb Optical Company, Rochester, N. Y., passed away on June 13, in that city. Mr. Lomb was almost eighty years of age, and his long and most successful career closes a line of achievements in the optical world that have seldom been equaled.

Charles W. Churchill, former manager of the Winton branch at New York, has gone to Cleveland to take up his new duties as sales manager of the Winton Motor Carriage Company. Charles Brown, manager of the San Francisco branch, will leave a fortnight hence to take Mr. Churchill's place.

James F. Fairman, for some time identified with the sales force of the New York & New Jersey Lubricant Company, New York, has severed his connection with that concern, to take a position with the Wilson Trading Company, 179 Greenwich street and 46 Cortlandt street, wholesale and retail dealers in auto tires, sundries and the like.

WARNER'S "AUTO-METER ARTIE."

After years of experience with the average office boy, one firm in the West, the Warner Instrument Company, of Beloit, Wis., have hit upon a clever scheme by which they have successfully tamed that specimen of procrastination. The Warner Company have fitted their mail cart with a Warner Auto-Meter and odometer combined, and by this means are pretty nearly able to tell just where the office boy has been when he returns with the mail cart.



According to President Warner, of the Warner Instrument Company, it is now a matter of record around the Warner office that since the autometer was placed upon the car the boy has become greatly interested and takes great pleasure in trying to make record runs to the post office, and the speed he can get out of the two-wheeled cart and the stories he tells have made him the envy of the other urchins who fill similar rôles in the business offices of Beloit's factories. It is also noticeable that the cart is equipped with a large automobile horn to enable him to make speed.

Thomas Motor Co., E. R.....	70	Uncas Specialty Co.....	60	Walker Bros. Co.....	51	Whitney Mfg. Co.....	59
Thompson Sons Co., J. P.....	50	Universal Tire Protector Co..	67	Warner Instrument Co.....	72	Windsor Mfg. Co.....	63
Timken Roller Bearing Axle		Utility Co.....	46	Waukesha Motor Co.....	50	Winship, W. W.....	63
Co.....	102			Wayne Automobile Co.....	49	Winton Motor Carriage Co..	112
Tincher Motor Car Co.....	91	Veeder Mfg. Co.....	96	Weed Chain Tire Grip Co....	82	Wisconsin Tire Protector Co..	66
Torbensen Motor Car Co.....	45	Vehicle Specialty Corporation.	58	Welch Motor Car Co.....	81	Witherbee Igniter Co.....	50
Tray Plate Battery Co.....	68	Victor Lamp Co.....	57	Western Motor Co.....	66	Wyman & Gordon Co.....	45
Trebert Gas Engine Co.....	49	Victor Tire Traction Co.....	77	Weston Elec. Instrument Co..	62		
Tucker, C. F.....	46			Wheeler & Schebler.....	109	York Motor Car Co.....	92
Tygart Co., E. A.....	46	Wachman Auto Mfg. & Sup-		White Co.....	107		
U. S. Fastener Co.....	63	plices.....	70	White & Bagley Co.....	Cover	Zimmerman Mfg. Co.....	87

SPECIAL NOTICES

Advertisements inserted under this heading at 50 cents per line; about 7 words make a line. Remittance should accompany copy. Replies forwarded, if postage is furnished.

Cars for Sale

A 1907 PACKARD touring car in A1 condition, with full equipment; price, \$3,750. Address Box 91, care The Automobile.

A 30 H.P. DeDetrich touring car for \$600, and one 1906 three-cylinder Elmore for \$550. For further particulars address, F. E. Lockwood & Co., 39 Wall St., Norwalk, Conn.

A TOURING CAR, seats five, good condition; complete, extras. EWELL, 898 Bedford Ave., Brooklyn, N. Y.

AUTO CAR RUNABOUT, just overhauled and painted, in good condition, will be sold cheap if taken at once. Inquire 29 Main St., Bristol, Conn.

BUICK 1907 model, two-cylinder, 22-h.p.; a sample car, otherwise absolutely new. Cost \$1,375. Yours for \$1,175. Further particulars and photo upon request. Halsey Auto Co., 3908 Olive St., St. Louis, Mo.

CADILLAC Runabout, fine condition, three new tires; no reasonable offer refused, as it must be sold at once. A. Schnell, 165 Grand St., Brooklyn, N. Y.

CORBIN Touring Cars and Runabouts, \$800 and up. Thoroughly overhauled by us and guaranteed. Corbin Motor Vehicle Corp'n of N. Y., 1888 Broadway, near 62nd St., New York City.

ELEGANT 1907 Pope-Toledo Roadster, fully equipped with Elsemann magneto, five lamps, Prest-o-Lite tank, top, extra tire with cover, etc. One of the finest outfits in Buffalo. A bargain for quick sale. E. R. Thomas Motor Company, Second-hand Dept., 1200 Niagara St., Buffalo, N. Y.

GET WISE—We have anything you want in second-hand cars—Packards, Wintons, Locomobiles, White Steamers, Franklins, Buicks, Oldsmobiles—and bargains at that. The Sid Black Automobile Co., 630 Walnut St., Cincinnati, Ohio.

MODEL M Cadillac Runabout; 4 new tires complete; 5 lights; new sprockets and chain; reason for selling, purchased new Cadillac touring car; no reasonable offer refused. W. L. Gray, Bullford, Conn.

NEW AUTOMOBILES that are strictly guaranteed, bought for cash, of overstocked manufacturers at forced sale prices, for immediate delivery and quick sale profits. They include Dolsons, Queens, Dragons, Orient Buckboards, Walthams, and numerous others. Apply for descriptive list and prices. If you are about to buy a second-hand car, do not fail to consult us. We have on our sales floors and ready for delivery, about every make of automobile there is. They are all substantial and well built cars that have been thoroughly overhauled in our shops and are equal to new both in reliability and appearance. We ask you on an average about one-fourth the original cost. They range in price from \$250 to \$3,000. We will gladly mail you our weekly list upon request. We have the largest and most complete stock of automobile supplies in America, and can give you cut prices on everything. We make a specialty of tires, have an immense stock on hand, of the best makes and can give you bargain counter prices. Send for our new 100-page catalogue and souvenir. The former is a dandy, and the latter, unique. Times Square Automobile Co., largest dealers in new and second-hand automobiles in the world, 1599 Broadway, New York, and 1332 Michigan Ave., Chicago, Ill.

MAXWELL 1907, 20-h.p. touring car. Seats five. Motor brand new; paint and tires in fine condition; fully equipped throughout; fine top; five lamps; clock; extra tire and tire holders; tire cover; tool box; tools, parts, etc. Bought another car, must sell this one. Act quickly. Maxwell Owner, care The Automobile.

ONE 1905 French type Oldsmobile runabout; good condition; minus tires; \$175. Frank Herbst, Wilmington, N. C.

POPE-HARTFORD Model B, improved, at \$400. Lock Box 323, Barre, Vt.

PACKARD 1905 Touring Car. First check for \$1,500 obtains this bargain. This car has just been overhauled throughout, is fast and reliable. Cost complete \$3,900. Send for photo and further particulars. Halsey Auto Co., 3908 Olive St., St. Louis, Mo.

POPE-HARTFORD, four-passenger, automobile in good condition, for sale or exchange. Wanted, cash or good land improved or unimproved, preferably in this or adjoining state. Write if you mean business. Dr. W. M. Martin, Wellington, Kan.

RUNABOUT in good condition; equipped with three lamps, top, and new 8-h.p. Illinois engine; \$250. Jos. Rohleder, Peoria, Ill.

STEAM AUTOMOBILES—Write for bargain list. F. W. Ofeldt & Sons, Nyack, N. Y.

STEVENS-DURVEY light touring, four-cylinder, Model R. Condition perfect. Car newly painted for owner. Will sacrifice as have purchased another car. Under Thousand, care The Automobile.

TIMES SQUARE Automobile Company, largest dealers of new and used automobiles in world. Send for our list of cars on hand; send for our big 100-page catalogue; everything at cut prices. 1599-1601 Broadway, New York City, and 1332-1334 Michigan Ave., Chicago, Ill.

TOLEDO steam runabout, \$65; Rambler runabout, single-cylinder, 8-h.p., \$150; 20-h.p., 2-cylinder Winton, \$250. E. S. Youse, Reading, Pa.

USED BAKER ELECTRICS—In excellent condition for giving the good satisfaction which is assured by the name of "BAKER." Wire Wheel Runabout..... \$400.00
Imperial 650.00
Suburban 1,050.00
Surrey 900.00
All cars have been thoroughly overhauled and new batteries put in. Baker Motor Veh. Co., 1790 Broadway, New York City.

WE are going to sell every second-hand car we have regardless of their real value, as we must have the room for other purposes. These include some exceptionally fine propositions, from two-passenger runabouts to seven-passenger touring cars. Get our list and make us an offer. E. R. Thomas Motor Company, Second-hand Department, 1200 Niagara St., Buffalo, N. Y.

WELSH Touring Car, 1907 model. Run less than 5,000 miles. Tires in good shape. A genuine bargain at \$2,500. Halsey Auto Co., 3908 Olive St., St. Louis, Mo.

WHITE STEAMER—1906, with '08 regulation equipment; double brakes on rear axles, demi-limousine body, with long doors, cape top, glass front, full set lamps; price \$1,500, complete. Address Box 39, care The Automobile.

WHITE STEAMER, Model F, in excellent condition. A. F. Crittenden, 32 Main St., East, Rochester, N. Y.

WINTON, 1907 Model M; top and dust cover, tire holders and tire case; extra tire; folding glass front; speedometer and gas tank; two extra tonneau seats; Kilgore shock absorbers; cost new \$4,000; will sell for \$2,250 and guarantee in first-class condition. C. C. Stoltz, Marion, Ohio.

WE ACT AS BROKERS for the quick sale of second-hand cars; we charge the owners only 5 per cent. commission. In this way we get a great many bargains from owners who, for various reasons, want money rather than the car. We can put you in touch with the owner, and you can often buy at your own price. We have always on hand from 100 to 200 cars of practically every make. We issue a weekly list of cars on hand which we will mail you on application. The following are special snaps for this week:

Mercedes, four-cylinder, 28-32-h.p. limousine, with extra touring body; fully equipped and cost over \$10,700. Call, examine car, and make best cash offer. Six-cylinder National touring car, that originally cost \$6,500; 50 to 60-h.p., 7-passenger, complete equipment of five lamps, horn, cape top, curtains, etc. Winton, K 1906, 4-cylinder, 40-h.p. touring car, of magnificent appearance, large searchlights, side lamps, horn and other extras; cost \$3,500. White Steamer touring car, 18-h.p., lamps, tools, top, and good tires; fine order, and ready for use; originally cost \$2,500. Columbia Electric Brougham, underslung batteries, finished in morocco, solid tires, Samsonized, magnificent for opera use; cost owner \$3,500. Four-cylinder Richard Brazier; cost \$4,000; side entrance, full equipment, top, good tires, etc. Pope Toledo touring car, 4-cylinder, 30 to 35-h.p., side entrance, just thoroughly overhauled and in fine order; cost \$4,300. Waverly Electric Runabout, newly painted, side lamps, tools, good condition. Columbia Electric Runabout, solid tires, good batteries, and top. Mason Engines, two, 4 1/2-h.p., 2-cylinder; suitable for autos or boats; cost \$150. Manhattan Storage Co., 334 West 44th St., New York City.

'06K WINTON, 35 H, top, glass front; A1 condition; \$1,050; cost \$2,600. A. L. Sheridan, La Fayette, Ind.

1907 STANLEY Steamer Model F Touring Car; high grade top, tool box, robe rail, electric gauge and tail lamp; boiler in strictly first-class condition; car thoroughly overhauled; owner going to Alaska. Full detailed information and price on request. Hawthorne Auto Co., Mason City, Iowa.

1908 MODEL G Marmon Touring Car, 35-40-h.p.; as good as new. Full equipment, including top, etc. Reason for selling, owner has ordered a larger and more powerful car of the same make. Brazier Automobile Works, 38th and Market Sts., Philadelphia, Pa.

Cars Wanted

I AM in the market for a 1906 Peerless Touring Car. In replying state price and condition. Box 92, care The Automobile.

WANTED—Franklin Runabout, model G, 1906, 1907; give complete description; lowest price for cash. Dr. J. H. Bryan, Asbury Park, N. J.

WANTED—Model R, 1907 Ford, four-cylinder Runabout at once. State full particulars and lowest cash price in first letter. Address D. E. Sunderland, 98 and 100 Mechanic St., Freeport, Ill.

WE WILL PAY full value in spot cash for your automobiles, in quantities from one to one hundred. Call or mail descriptions. Broadway Mammoth Automobile Exchange, 245 West 56th St., New York City.

WILL buy 1906 Peerless Touring Car at once. Quote price and condition. H. C. Mayo, 69 Fourth St., Wellington, Mass.

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(Special Notices continued from page 42.)

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AUTO TIRES—All the best makes of tires on hand, at cut prices; a big stock of "specials" and "seconds" at "Bargain Counter Prices"; we will save you money on any make and any size; write or call. Broadway Mammoth Automobile Exchange, 245 West 56th St., New York City.

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AUTOMOBILE TIRES—Overstocked with second-hand casings and tubes, all sizes, right prices; tire repairing, recovering, rebuilding; best workmanship and material. All work done on short notice. Tel., Harrison 7301. Bebbler & Coen, 331 Michigan Ave., Chicago, Ill.

BODIES—We have a few 5-passenger touring car bodies, in two sizes: 69 1-2x34 1-2 on bottom, price \$40; 80x34 1-2, price \$50. Are new bodies, finished in Quaker green, upholstered with curled hair and genuine leather; prices cash with order, f.o.b. cars Waltham, crated. Illustration and blueprints showing all dimensions sent upon request. We also have a few 1908 model steering columns with worm gear for sale. Waltham Mfg. Co., Waltham, Mass.

BOWSER Gasoline Pump and 300-gallon Tank, with 30 feet of pipe, complete. Guaranteed by the manufacturer until October, 1909. Make a cash offer. Address Garage, care The Automobile.

BRAND new 4-cylinder Connecticut dash coil, \$27; one Splittorf 4-cylinder dash, \$17; one two-cylinder, \$10. Charles A. Vuille, Huntingdon, Pa.

FOR SALE—300 sets 28x3 best grade artillery wheels fitted with clincher rims, less hubs; write for bargain prices on single sets or the lot. Thomas B. Jeffery & Co., Kenosha, Wis.

FORD RUNABOUT OWNERS—You can make a handsome "Roadster" of your car, with our rumble seat and trunk, glass front, new fenders with brass bound running boards, folding hood, "hood dash," etc.; send for catalogue; avoid spring rush; order now and save money. Auto Rebuilding Co., Chicago, Ill.

FOUR-CYLINDER air-cooled motors, \$100; wood wheels, \$15 per set; sliding gear transmissions, \$20; worm gear wheel steering devices, \$22; planetary transmissions, \$20; opposed motor, \$65; spark coils, \$2 each. Auto Parts Co., 99 W. Monroe St., Chicago, Ill.

KINGSTON CARBURETERS.—Model C, 1907, new 1 1/4-inch, \$4; 1 1/2-inch, \$4.50; Universal Model D, 1907, new 1-inch, \$3.50; Holley, slightly used, Model E, 1 1/4-inch, \$3; 1 1/2-inch, \$3.50; a few 1 1/4-inch Schebler, Buffalo, and Universal at \$5. McLean & Brotherton, 73 Home Bank Bldg., Detroit, Mich.

REBUILD YOUR CAR into "Gentleman's Roadster." We make latest style hoods, radiators, tanks, fenders, "hood dashes," glass fronts, rumble seats and trunks, etc. 20 per cent. saved, your old car redesigned free. Hood and dash outfits for '03 and '04 Ford, Cadillac and Winton in stock. State your needs for catalogue. Auto Rebuilding Co., Chicago, Ill.

SINGLE CARBURETER OUTFITS, '05-'06 Reo, '05-'06 Ford, Maxwell, Buick, Cadillac; also commutators, slip covers, top hoods, under shields, folding fronts, running boards, mud splashers, tire protectors. All specialties. State your wants. Jenkins Specialty Mfg. Co., Sumter, S. C.

TIRES for automobiles; brand new goods; overstocked; 28x2 1-2, \$8; 28x3, \$14.50; 28x3 1-2, \$14.80; 30x3, \$14; 30x3 1-2, \$16.50; 30x4, \$18.75; 32x4, \$20; write for other sizes; will surprise you. A. H. Kasner, 152 Church St., New York. Largest Tire Dealers in U. S.

TIRES—We sell any tire on the market; new casings at the following prices: 28x2 1-2, \$9 each; 28x3, \$17 each; 30x3 1-2, \$20 each; 32x4, \$26 each; 34x4, \$27 each; other sizes and tubes in proportion. Chicago Vulcanizing Co., 1463 Michigan Ave., Chicago, Ill.

4x4 AIR-COOLED opposed motor, new, \$75. Would take second-hand engines in trade. Comet Motor Works, Madison & Canal Sts., Chicago, Ill.

\$55 BUYS 7-h.p. Auto Engine, transmission, tanks, etc., complete; perfect condition. M. P. Cushing, Dedham, Mass.

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POSITION wanted by expert auto repair man as chauffeur. Address Matthews, care The Automobile.

SALESMAN wants agency for specialties, or a line suitable for the New England automobile trade. Address Box 780, care The Automobile.

Help Wanted

WANTED—By a prominent automobile manufacturer, salesman of experience as district manager. Address, giving experience, references, and salary expected. Box 33, care The Automobile.

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INSURANCE for automobiles—Broad, safe policies at lowest prices; insurance against fire, self-ignited explosions, transportation hazards, theft, etc.; best services guaranteed, no matter where insurer is located. For particulars, address H. W. Beals, 76 William St., New York City. 'Phone, 3052 John.

INSURANCE for motor cars against every risk, including fire, explosion, self-ignition, theft, collision, accident, transportation, perils and other damages; cars insured anywhere in the world by the kind of "Policies that Protect," at the lowest rates of premiums; automobile ball bonds to cover all States; demonstrating policies for the trade. Dixie Hines, Times Building, New York City.

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THE AUTOMOBILE industry offers a great opportunity for the ambitious man to secure a permanent paying profession. Its growth has been marvelous. It is yet in its infancy. New York City alone will require within two years 5,000 taxicab drivers; commercial vehicles as many more. A competent, careful driver is always in demand for pleasure cars. The supply is limited and the salaries high; the associations are first-class. We can make you a skilled driver, mechanic or salesman. Also course on automobile designing. Write us now for prospectus of terms, etc. New York School of Automobile Engineers, Inc., 146 West 56th St., New York City.

817 MEN who enrolled in our automobile school last season say their time and money were well invested. Our courses are thorough and practical. We have a large garage, completely equipped, and expert instructors. The school is not run to make money, but to give men a thorough course of instruction at a minimum cost. Catalog sent on request. West Side Y. M. C. A., 310 West 57th St., New York City.

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CARRY A BURROWES emergency rim or spare wheel on step of your car, all inflated ready to clamp to side of car wheel. No need of removing punctured tire till you get home. Local agents wanted. E. T. Burrowes & Co., Portland, Me.

CLASSIFIED LIST all licensed automobile owners in Iowa, compiled by towns and alphabetically arranged to June 1, 1908. One dollar per copy, postpaid. Address W. J. Wallace, care Sears-Nottinger Co., Des Moines, Iowa.

CHAUFFEURS, machinists and repairmen can secure, free, a set of Bullard wrenches; write us for special offer. Bullard Automatic Wrench Co., Providence, R. I.

STOLEN; STOP THIEF; \$200 REWARD.—No. 701 Studebaker touring car, deep red, black trimmed, brick red gear, paint scraped off right fender, Rushmore lamps, tires smooth and Bailey tread, triple springs. Harry Wood, 871 Warren Ave., Chicago.

THE AUTOMOBILE HAND BOOK.—By L. Elliott Brookes. Over 100,000 copies sold. This sale guarantees absolute authority. This work was written to supply practical information to automobile owners, operators and chauffeurs, including road, motor, carburetor, ignition, battery, clutch and starting troubles, with information of value to automobile mechanics. Pages, 490. Over 180 illustrations. Leather bound, \$1.50. Frederick J. Drake & Co., 214 Fisher Bldg., Chicago, Ill.

TIRE REPAIRING is our business, and we know that our vulcanized repairs give satisfaction to our patrons. Why not give us a trial? Once a customer, always a customer of the Model Vulcanizing Co., 1547 Michigan Ave., Chicago, Ill.

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28x3 Casings, \$12.00 Tubes, \$3.00

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Other Sizes in proportion. Write for list.

We can sell any make tire for less money than any dealer in America

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The best
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SUBSCRIBE FOR THE AUTOMOBILE.
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No waste of time

No broken fin-
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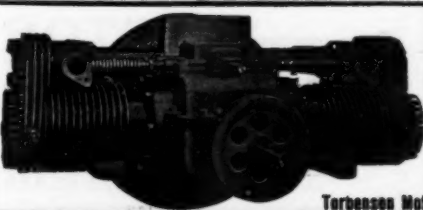
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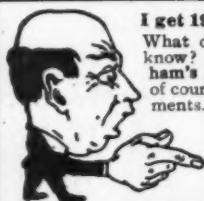


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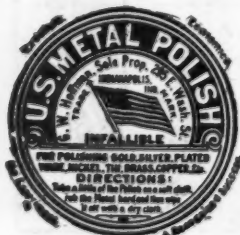
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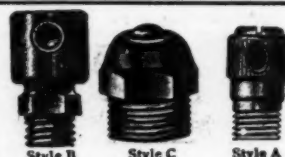
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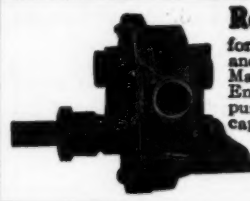
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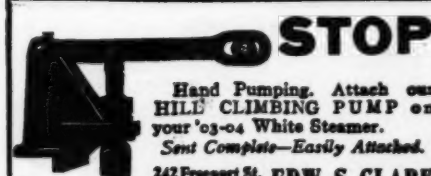
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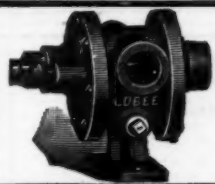
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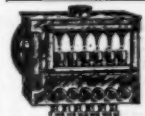
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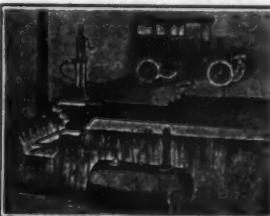
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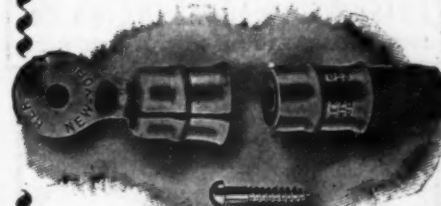
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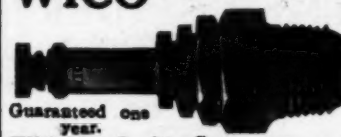
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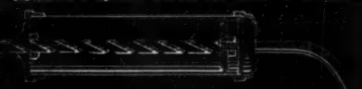


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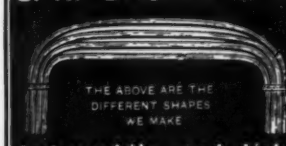
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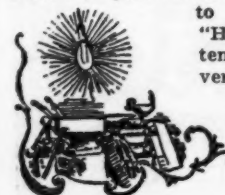
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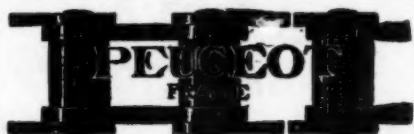
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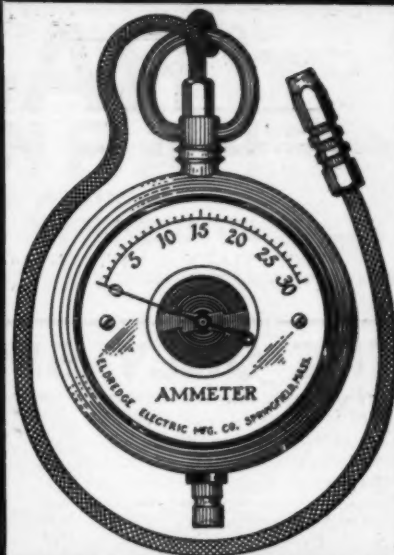
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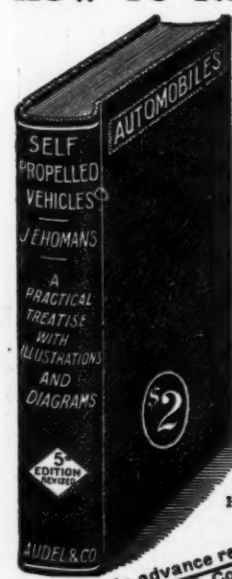
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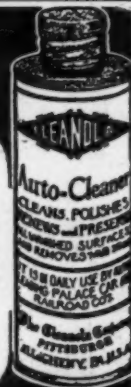


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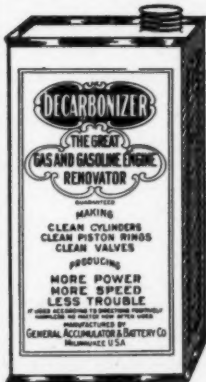
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Fires the charge at the center of compression, allowing spark to travel in all directions at the same time. If, for instance, the time consumed by ordinary ignition is 1-10 second, the center fire plug reduces it to 1-20, bringing explosion nearer the turning point of the piston and increasing power from 5 per cent. to 15 per cent. according to build of engine. Ignition point is away from sides of cylinder where they keep clean and unsooted.

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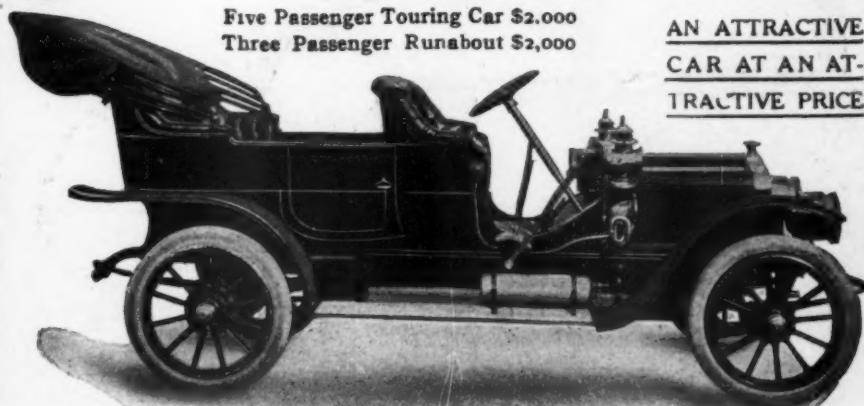
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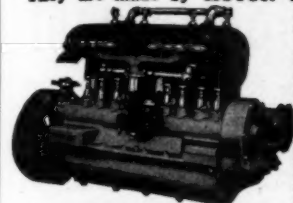
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Dixon's Motor Graphite helps compression in cylinders, quiets noise in gears, makes smooth running throughout. Booklet 9 G tells

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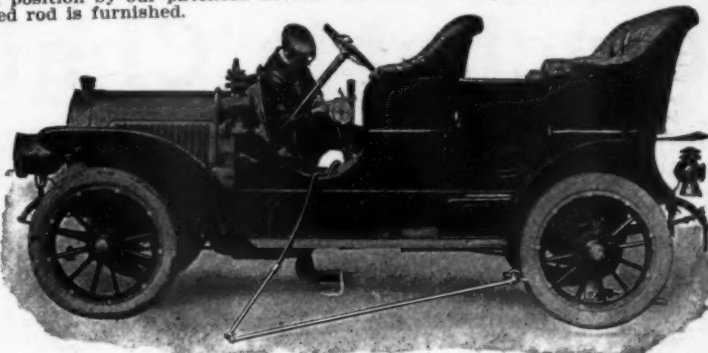
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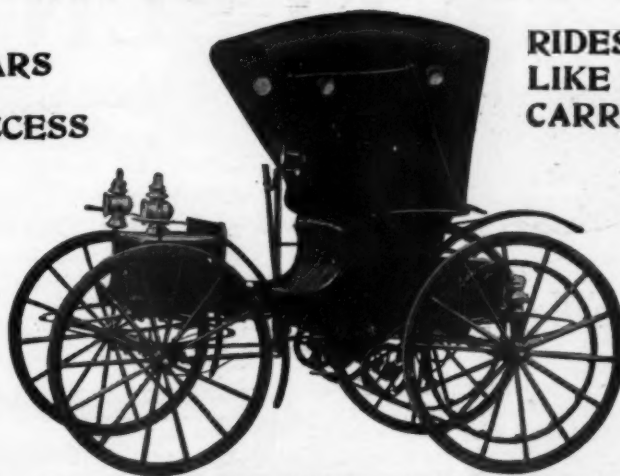
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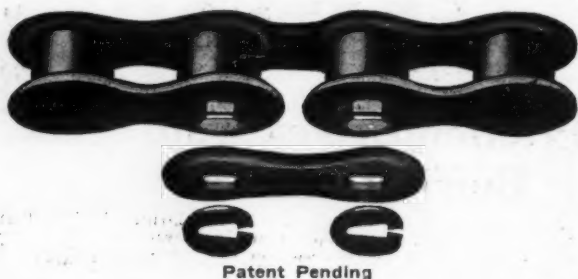
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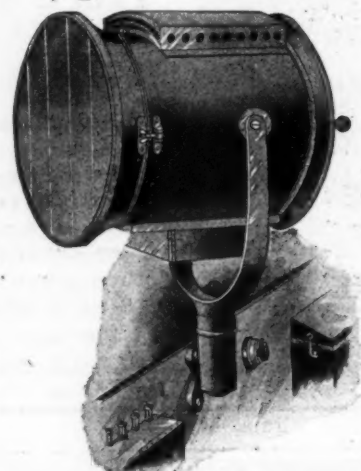
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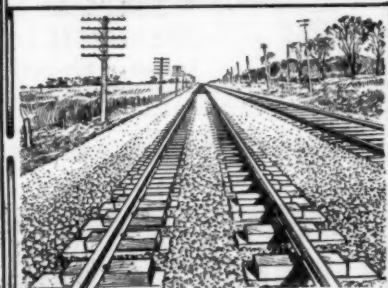
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is ever mindful of the safety and comfort of its patrons. Perfect passenger service between CHICAGO, ST. LOUIS, KANSAS CITY and points beyond.



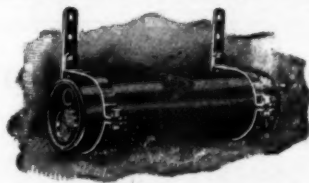
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 Inflates Largest Tires
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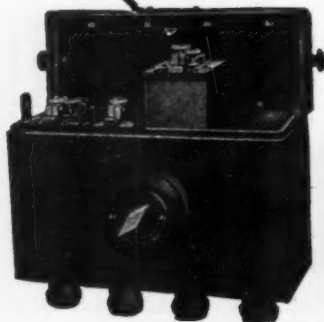
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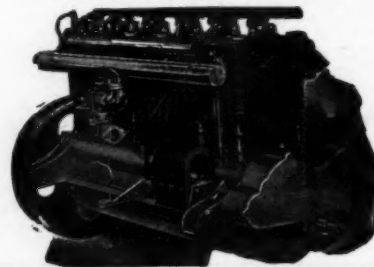


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and the above mentioned materials, will have
everlasting efficiency and durability. We will
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The Best
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EVERYTHING
for
EVERYBODY

That Ever Drives
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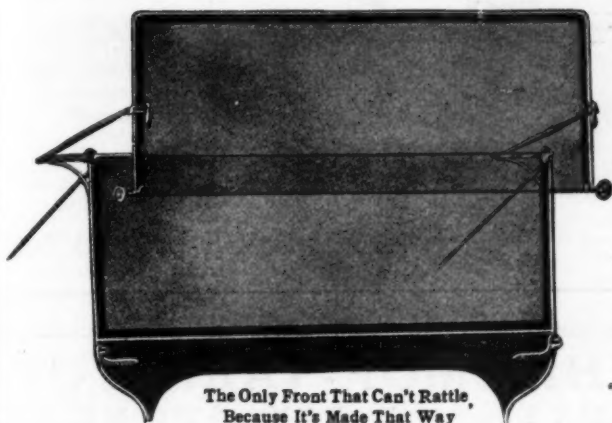
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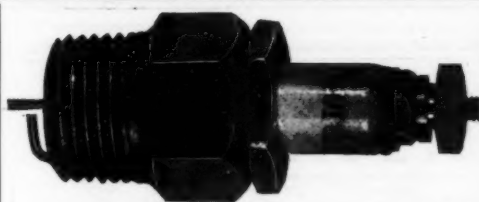


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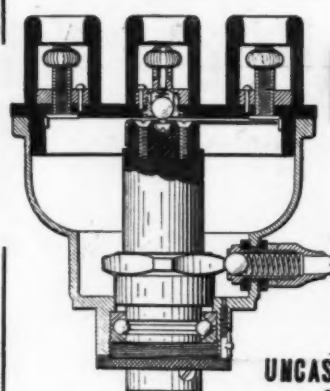
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THIS MOP-YARN TOP OUTLASTS SIX SPONGES

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36	18.00	840	18.00
28 x 3 1/2	16.00	870	19.00
30	17.00	910	21.00
32	18.00	960	22.00
34	19.00	1010	24.00
36	21.00	765 x 105	19.00
30 x 4	19.00	815	21.00
32	20.00	875	22.00
34	21.00	915	24.00
36	22.00	930 x 120	22.00
32 x 4 1/2	24.00	850	23.00
34	24.00	880	24.00
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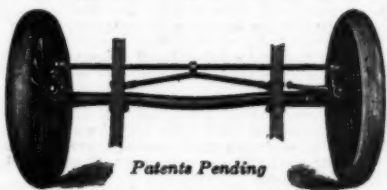
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THE LITTLE STEERSMAN

The only Automatic Steering and Safety Device. Will guide your car when you lose control. Insures your safety and your car. Easily attached to any auto. Price \$10.00. Satisfaction Guaranteed.

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The SLAMA TIRE PROTECTOR

LIKE A COAT OF MAIL

in its flexibility is The Slama Tire Protector. Made of cross-shaped, steel links, case hardened. Protects the tire from punctures and skidding.

Fits any Tire made.

Easily attached.

Is not fastened to tire, wheel or rim, so cannot injure tire.

For smooth or rutty roads.

The best Anti Skid made.

Write for new booklet

Slama Tire Protector Co.

612 East 15th St., Kansas City, Mo.



GARAGE MEN SEE HERE

We want every garageman to get our proposition, covering the equipping of one car in each garage with our "Lookout Cleaner" at no cost. It's pretty near the last item about a car needed to bring pleasure up to the perfection notch and to reduce danger to the minimum. Here's a story too well known to call for much talk. Read every word.

A LOOKOUT CLEANER



Picture No. 1

shows a driver hopelessly attempting to discern the road and its attendant dangers through a windshield during a rainstorm. We all know the bother and exasperation of such a condition.

Picture No. 2

depicts the same man availing himself of the only alternative known to motor car drivers, when the rain has made it a physical impossibility to see through the windshield.



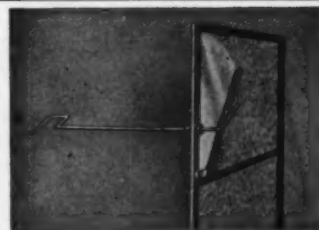
Picture No. 3

illustrates the utility, convenience and absolute necessity of our "Lookout Cleaner." Regardless of storm conditions, the driver has only to turn a handle that is always easy to reach, and by a twist of the wrist clean a lookout space on the windshield, exactly as shown in the picture.

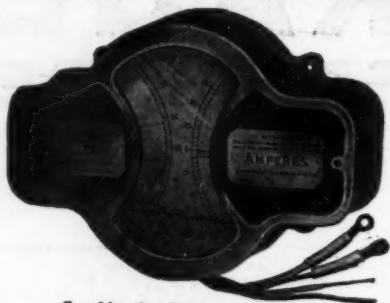
Here is a device that is as much of a necessity as the glass front itself or a top and storm curtain. It will fit the frame of any glass front ever made, may be attached or taken off in less than one minute's time, costs but very little, and serves literally as a life-saver to both drivers and pedestrians. Nine out of every ten persons run down by motorists would have escaped if the driver had seen them in time—and more than half of the fatal mishaps occur on stormy days or nights, when to see through the clouded glass front is almost a physical impossibility. Every motor car owner needs a "Lookout Cleaner." The wiser ones will get theirs QUICK.

Write for circulars and prices. Dealers, get our liberal proposition. We want hustling agents everywhere. Big profit-making suggestions for Garagemen. Write today.

Glass Front Cleaner Mfg. Co. 55 Wabash Ave. Chicago, Ill.



WESTON ELECTRICAL INSTRUMENT CO.



Combination Volt and Ammeter
Model 30

Electrical Measuring Instruments

FOR USE IN

Electrical Carriages and in Charging Stations

Send for Catalogue

Main Office and Works, Waverly Park, Newark, N. J.
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Switchboard Instrument
Model 24



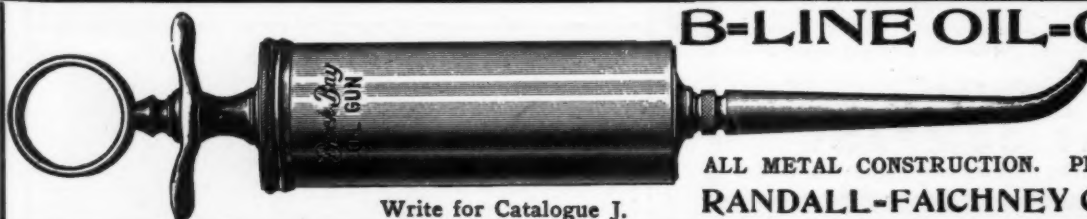
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MAXIMUM IGNITION EFFICIENCY

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FULL PARTICULARS AND PRICES ON REQUEST.

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B-LINE OIL-GREASE GUNS

ALL METAL CONSTRUCTION. PISTON GROUND TO FIT.
RANDALL-FAICHNEY CO., Boston, Mass.

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The Celebrated Brampton Chain

They are rapid sellers and bring many duplicate orders. Every customer A SATISFIED CUSTOMER and a daily advertiser for YOU AND THE BRAMPTON CHAIN. They are the strongest chain on the market. Made of self-hardening steel. We have in stock all sizes to fit American and foreign cars.

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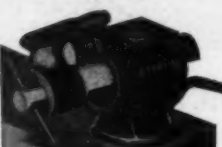


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"STERLING" Auto Vise.
A 4-lb. Vise—attached instantly to running board. Indispensable for road repairs; eliminates necessity of carrying extensive outfit of tools on your auto; jaws removed instantly to use as wrench or pipe wrench; sufficient adjustment to take in any screw or pipe; complete with polished brass plate for running board.

Price \$3.50 prepaid



For Heavy Duty Price \$1.00 prepaid



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Manufacturers of Snap Fasteners and Metal Goods.
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THE GEMMER STEERING GEAR

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Can be readily adjusted to take up slack due from wear. Strictly a gear of QUALITY. We would like to send interesting descriptive matter and prices to every reader of this paper, proving its value and usefulness on your car. Write to us—write to-day, stating type of car you use.
We are now in our new factory and our capacity ensures prompt deliveries.


WE MANUFACTURE FOR THE AUTOMOBILE TRADE

Complete Front and Rear Ball-Bearing Axles

THAT ARE WELL-KNOWN FOR DURABILITY AND EFFICIENCY


Call on or write us regarding your requirements.

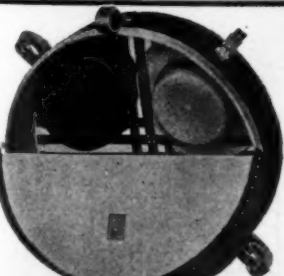
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What It Is and How To Do It. A book of 150 pages neatly bound in cloth. Sent postpaid for \$1. Address Book Department, The Automobile, 231-241 W. 39th St., New York.





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Round trunks for ladies' or gents' hats, or inner tubes, etc. Fit inside extra shoe





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ACCURACY and DURABILITY GUARANTEED

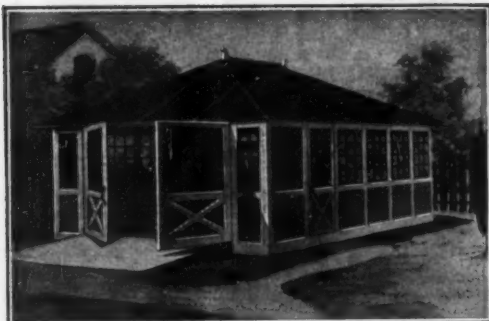
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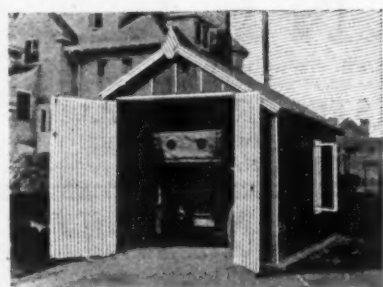


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Inexpensive,
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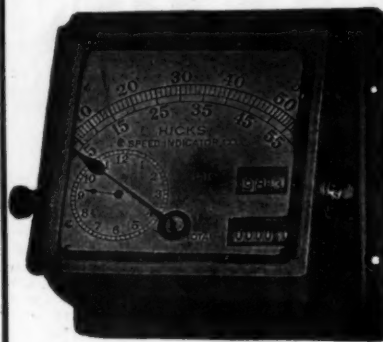
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The Garage That Can't
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Centrally Located, Opposite Camden Station,
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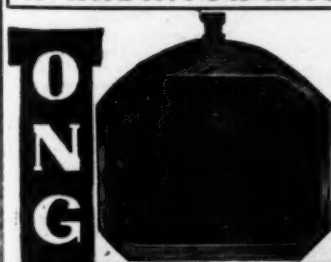
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LONG'S RADIATORS

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Accurate and Dependable Always

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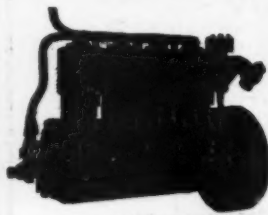
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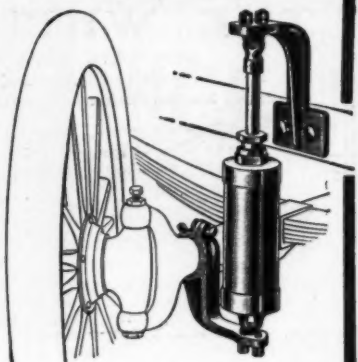
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Contains a fund of information regarding
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Send for copy.

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No more cranking. Easily fitted to any motor. Compact. Takes up little space. Small weight. Absolutely positive in action. No possibility of back firing. Nothing to wear out. Always ready for use. Starts motor when cold. Nothing to get out of order. No interference with regular equipment of car. Convenient to use. *Moderate Price.* Sold under positive guarantee. Write for descriptive circular and price.

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Simplicity is the Keypnote of our Models.

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est tire in one minute, giving pressure up to 90 lbs. Catalog No. 16 gives all particulars and price.

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The Emergency Wheel

Eliminates Tire Troubles

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It is sold through the

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BUFFERS PROPELLER SHAFTS
HAND LEVERS ETC.

Send for cuts, prices, etc. Your own designs manufactured in quantity.

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Holds any
Blowout

Fits any
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Instantly
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UNIVERSAL TIRE PROTECTORS

are made of special selected chrome
leather with reinforced steel armored
tread. Secured to any tire in 30 seconds
so tightly they cannot creep.

Universal Tire Protector Co.
Angola, Ind.

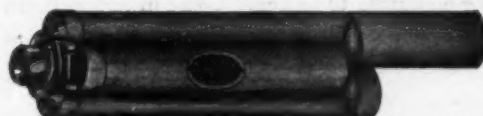
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May 21, 1907
Other Pat-
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Send or
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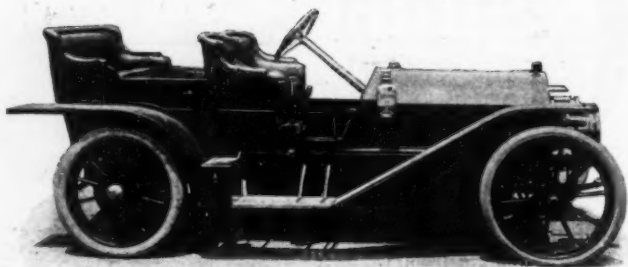


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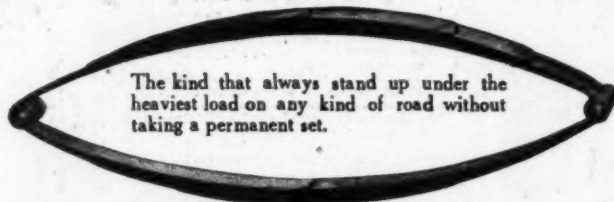
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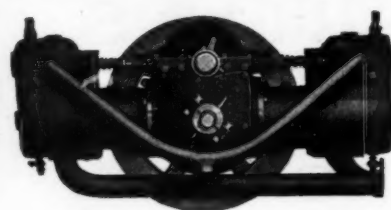
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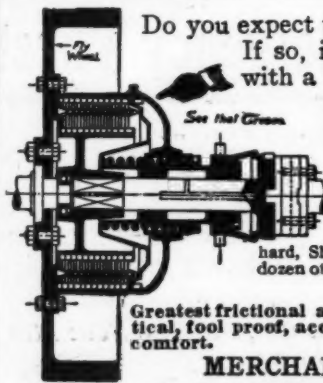
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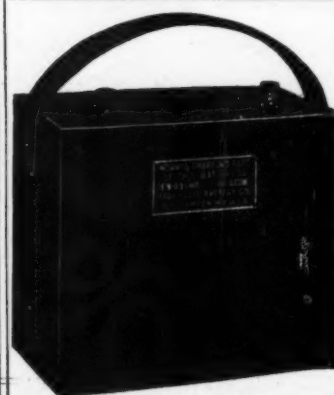
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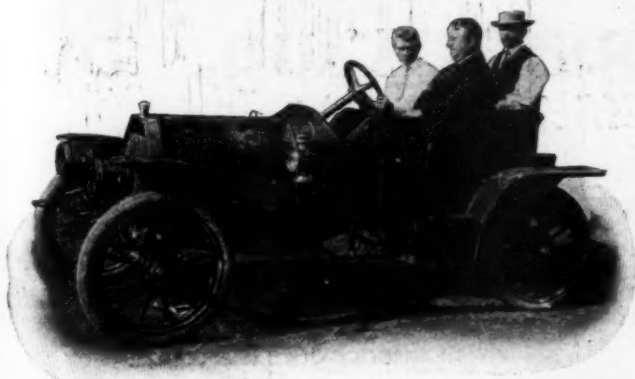
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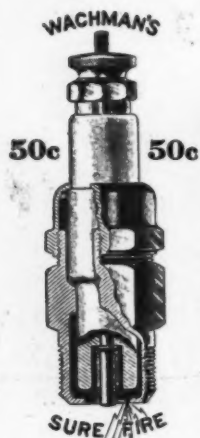


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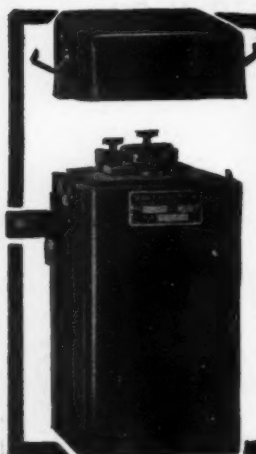
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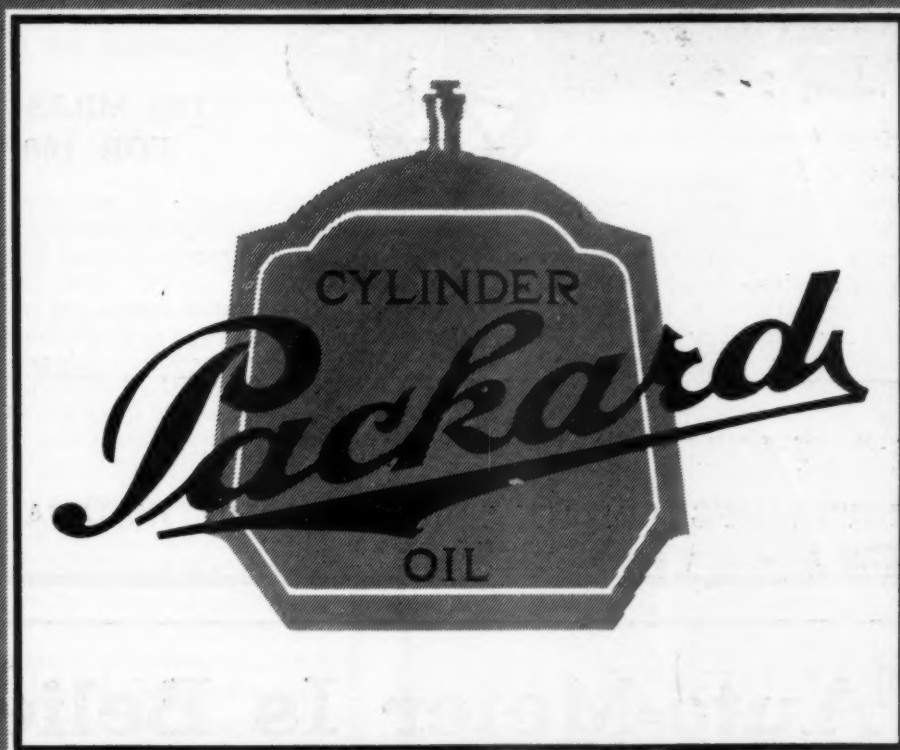


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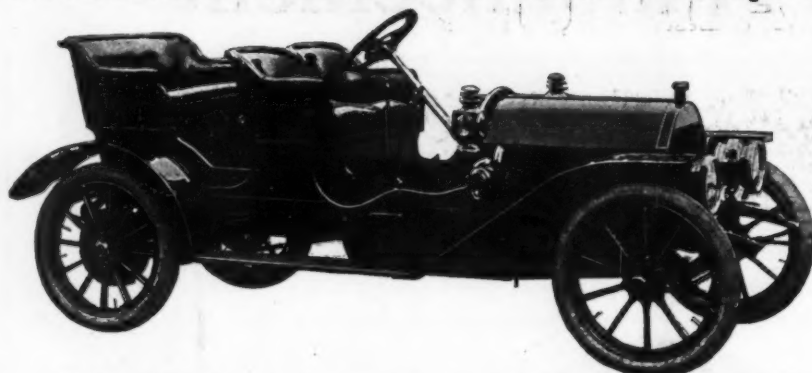
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Memorial Day, 1906, non-stop run, New York-Boston-Springfield, Knox Waterless made record, Warner-equipped.

Franklin Car, San Francisco-New York, 4500 mile run, August, 1906, Warner-equipped.

Percy Megargle with Req Mountaineer, across continent and back, 12,000 miles, 1906, Warner-equipped.

Military Message Run, Chicago-New York, June, 1906, Buick car, Warner Auto-Meter.

Military Run, New York-San Francisco, Aug., 1906, a Warner was used.

Red Cloud, Olds, Trans-Continental Run, 1907, Warner equipped.

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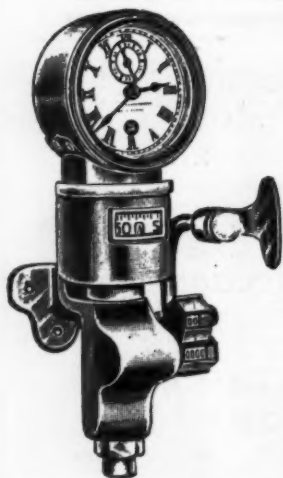
Long Island Economy Run, Frayer-Miller winner, was Warner-equipped.

In New York-Paris Race only speed indicator in the run is a Warner Auto-Meter.

Ralph Owen, driver of Mudlark, 1908, bought a Warner for his car though offered another as a gift.

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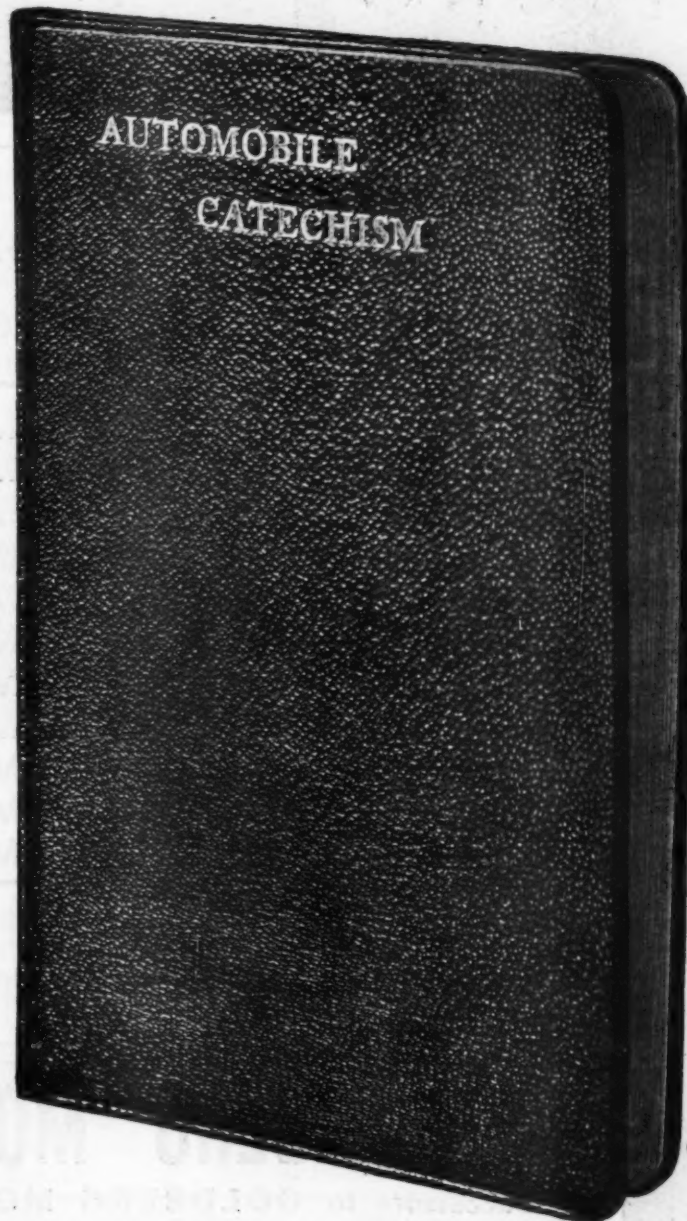
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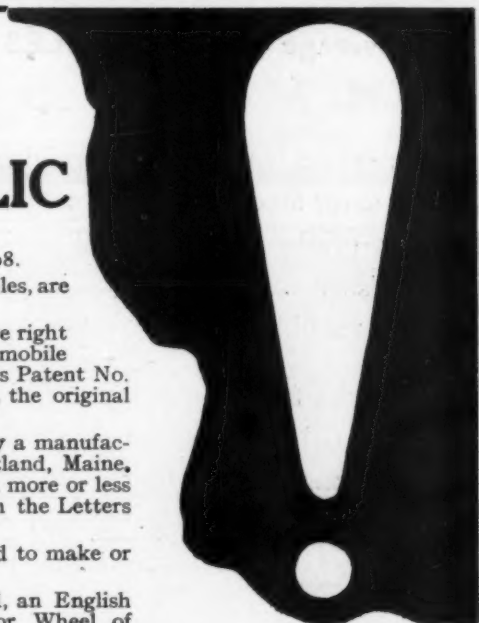
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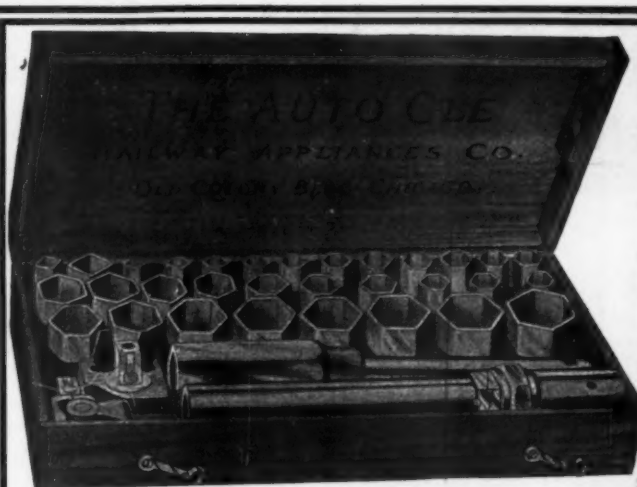
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Cleveland, 1120 Euclid Ave.

LATEST New Supplementary

WRITE FOR IT
Revised Prices



The Growing House.

MANUFACTURERS, DISTRIBUTORS
AND JOBBERS OF

**Automobile Parts, Supplies and
Accessories**

NEUSTADT AUTOMOBILE & SUPPLY CO.,

3954 OLIVE STREET, ST. LOUIS, MO.



WEED WEATHER!

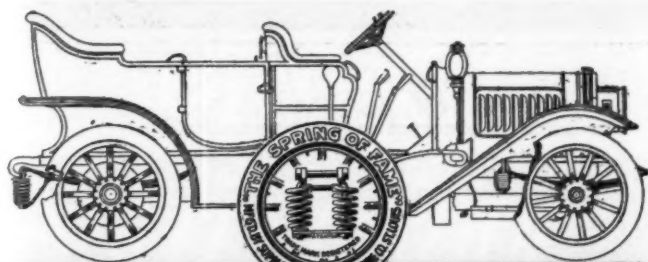
When it starts to rain—that's the time to put on your **WEED CHAINS**

It is not possible to skid or slip, and your tires will be preserved, and the road or street is not injured through the use of WEEDS.

WRITE FOR BULLETIN

WEED CHAIN TIRE GRIP COMPANY

27 Moore St., New York



SUPPLEMENTARY SPIRAL SPRINGS

the greatest device in the world for saving your automobile—whether single cylinder or eight cylinder—easy riding or hard riding. Applicable to all cars—efficient on all cars. They will save their cost many times in a year and will add

New Luxury, New Life, New Speed, New Comfort

They are so simple. Their principle so correct that they cannot fail. Here are a few extracts from letters from users—send for leaflet showing reproduction testimonials in full.

"I cannot praise them enough"—HERBERT Z. TURNER. "I would not take \$300 for them"—WM. BARRY OWEN. "Complete satisfaction"—E. E. GRAY. "I unhesitatingly recommend"—VIRPHEN R. DOW. "It would have been impossible to make the trip"—W. A. PICKERING. "We cannot say too much in their favor"—J. A. MISBAUM. "There are no faults I can find"—R. A. BRINE. "They are everything you claim"—DR. F. E. BUCK. "100,000 miles, no broken springs, great comfort"—C. W. NUGENT. "65,000 miles—indispensable"—A. N. ABRAMS. "35,000 miles, no broken springs—as good as the day bought"—C. A. MADDILL. "10,000 miles, no spring trouble, repair bill saved"—SYLVESTER J. SIMON. "10,000 miles, perfectly satisfactory"—R. C. PAYSON. "I cannot understand how I did without them"—LEOPOLD KAHN. "Thoroughly satisfied with them"—E. W. GIBSON. "I openly recommend them"—FRED C. MITCHELL.

The Price is about one-half that asked for complicated devices, that at best can produce temporary results only, when New. Ours need no attention, no mysterious contrivances to oil and continually adjust. **Fully Guaranteed.** Write for full information and prices.

BEWARE OF IMITATIONS

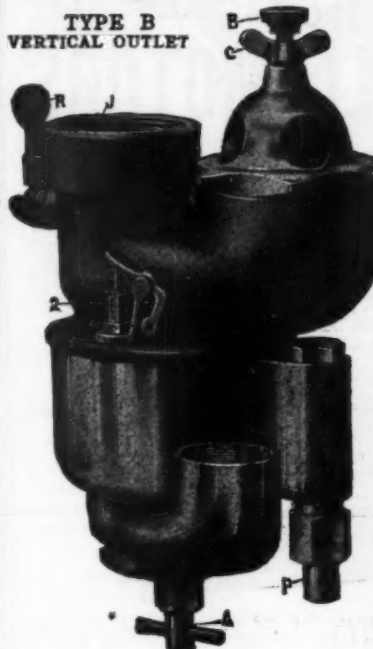
SUPPLEMENTARY SPIRAL SPRING COMPANY

4529 Delmar Ave., St. Louis, Mo.
New York, Motor Mart Building
Branches: New York, Motor Mart Bldg.,
1876 Broadway. Chicago, 1218-20 Michigan Ave.
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Kingston Carbureters

TYPE B
VERTICAL OUTLET



SHOULD be the regular equipment of every car; good results require a good Carburetor. "Kingston" Carbureters insure reliable carburetion—a uniform and perfect mixture, ALWAYS. They meet all running conditions most satisfactorily and are most durable and economical. Owing to their all-round perfection they have gained a most extensive popularity in all parts of the world.

**Over 81,000
now in use**

The 1908 line consists of eight different types to meet every possible requirement. They are the same dependable, efficient Carburetors of quality they have been for years, changing only in new features and improvements as new conditions demand.

"Kingston" Carburetor on a car is a small thing to look for, but a big thing to find, for it guarantees that so far as Carburetion is concerned it is the most reliable car in the world.

INSIST ON "KINGSTON"

Sold by leading jobbers throughout the United States.
Send for special descriptive Catalog.

BYRNE, KINGSTON & CO., Kokomo, Ind., U.S.A.

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SWINEMART Dependable Tires

Never puncture or come off. Contain best grade of rubber obtainable; properly cured to give **AMPLE RESILIENCY** and years of service.



Tool for applying free

Write for Catalog C and users' opinions

The Swinemart Clincher Tire and Rubber Co.

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New York
875 7th Ave.

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1231 Michigan Ave.



**Just to
Satisfy
Yourself**

that the

SPLITDORF Common Sense Plug

is a mighty good plug, use one in your engine. You will find it gives you better ignition than any other Plug. Price, \$1.25.

C. F. SPLITDORF, Walton Ave. & 138th St. New York
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The STEVENSON CARBURETER

**We
Don't
Want
Money
Nor Your
Order**

but we do want
you to write to us.

Not with any obligation to buy, but for information of this Carburetor that is revolutionizing Automobile Carburetion.

We can't tell you here how or why it does it, but it is something that will interest you and something that you need to know—that you want to know.—WRITE TO US TODAY.



HENRICKS NOVELTY CO.
127 S. CAPITOL AVE. INDIANAPOLIS, IND.

Just a Few of the Many Points
of Excellence embodied in the

—1908—

BROWNELL MOTORS

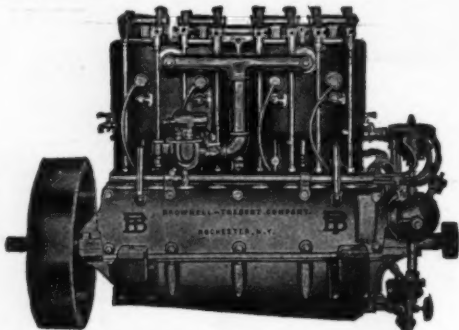
ARE

Highly perfected detail of valves and valve mechanism.
Most efficient, simplest and cleanest automatic oiling
system ever devised.

Perfect cooling under all conditions.

Extreme power and economy of fuel for size of cylinder.

Large, well-fitted bearings, smooth and quiet running, and
accessibility of all parts.



Our Motors are of best material and workmanship through-
out. Great attention paid to smallest as well as largest
details of manufacture.

We build a variety of sizes, in 4, 6 and 8 cylinders, from
14-h.p. to 150-h.p.

Ask for our new catalogue, illustrating and describing our
1908 MOTOR.

F. A. BROWNELL MOTOR CO., Rochester, N. Y.

LOCKE & COMPANY AUTOMOBILE BODIES

¶ are now taking orders for early de-
liveries of Limousines, Landaulets, and
other forms of closed bodies.

¶ Without parallel in this country or
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¶ Combining extreme elegance, most
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¶ Not low in price, but the highest
grade of work and finish that can be
produced.

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18'x20'; Double Hip Roof. Built for Dr. Herrick, 684 State St.,
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Excessive garage charges, the long delays after ordering your
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your own premises—a

SPRINGFIELD PORTABLE GARAGE

A garage built along the lines of not how cheap, but how
good. It houses your automobile safely and where it is free
from the destructive odors of public garage or stable. You
always have your car ready for instant use.

Write for full particulars and prices.

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The Invincible Schacht

A
Wonder
in a
Hundred
Ways.



The simplest, most practical, efficient and economical
car ever built. Sixteen H.P. Friction Drive. Any speed
up to 30 miles per hour. All parts interchangeable and
thoroughly "getatable." Large wheels with cushion
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rides like a pneumatic. The greatest selling proposition
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at once for catalogue, etc., and be convinced.

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THE USER OF THE MACHINE
KNOWS BEST WHAT SPARK PLUG
GIVES HIM THE LEAST TROUBLE

"SOOT-PROOF"



Plugs Have the Largest Sale Among
Dealers and Garages in the World.

Every Automobile Supply
House or Garage sells them

Regular 1-2 Inch and Metric,
\$1.00

Magneto and Extension
Types, \$1.25

FIT ANY MAKE OF CAR

Insist that your car is equipped
with them

None genuine without the name C. A.
Mezger on the porcelain.

C. A. MEZGER, Inc.
MANUFACTURERS
1759 Broadway, New York
National Sales Corporation, Factory Sales
Managers, 296 Broadway, New York

You can't foul this plug
so it won't work.
Heat won't break the insulation
It can't become short-circuited
It can't leak



The Edco Plug

is a better plug than any other because it
is better made, upon a better design and
from better materials than any other plug.

Look at its construction.

The man who knows will readily see its
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Ask your dealer to show you an **Edco
Plug**, or write to the New York office for
further particulars and price.

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Interior construction
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EDCO PLUG

Made by
Edouard Dubied & Co., Couvet, Switzerland

★ "THE STAR" ★ SPEEDOMETERS



Style No. 1010, Price \$50.
Scale 60 miles.

There are no punched Gears used in the
Star instrument; all working parts are cut
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made especially for this purpose.

FULLY GUARANTEED IN
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Being Manufacturers of Steering Wheels Exclusively, we
do this one thing well. The quality of material and work-
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where and our prices are no higher than for wheels of
questionable reliability.

One
Piece



Bent
Maple

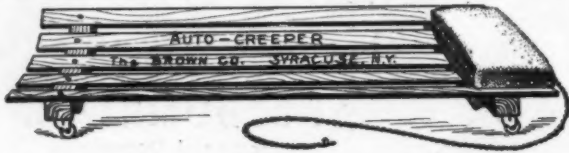
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Let us be your Steering Wheel Manufacturing Depart-
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WRITE TO-DAY for our SPECIAL PROPOSITION
Sample Wheels and Prices They Will Interest You

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It is better to have made adjustments under side than to have wished you had. Built for practical service, fits the back, swings easily and a durable, soft pillow for head. Saves clothes and time.

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XX CENTURY JACKS ARE BEST FOR GARAGES

A cheap jack is an especially bad investment in a garage. It can't stand the knocks, and is most likely to go wrong just when you want to lift a car in a hurry.

An XX Century Jack has no cast iron parts to break, no delicate jiggers to queer its action and it works easily and rapidly, and is always safe. While it beats the others for garage work, it costs no more than inferior jacks.

Made in three sizes.

Ask your dealer or write for prices and literature.

JOYCE-CRIDLAND CO.
Dayton, Ohio

Western Representative
J. Curtis Barcus, Farina, Ill.

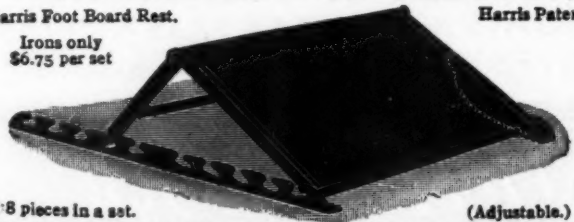


AUTOMOBILE FOOT RESTS.

Harris Foot Rest Board.

Harris Patent.

Irons only
\$6.75 per set



8 pieces in a set.

(Adjustable.)

(The foot board to be made and covered by the customer, to suit the car.) We furnish the iron parts only for foot rest. The foot rest board is 9 inches wide and can be set at any angle. The side notched pieces are 18 inches long, and are to be screwed on inside the body on the floor. The foot board irons are made wide enough for large tonneaus. On large orders, they can be furnished to exact width of body. When foot rest is not in use, it can be laid down flat. It is the simplest and most comfortable foot rest made. Manufactured by

CHAS. J. HARRIS, 457 Mill Hill Ave., Bridgeport, Conn.
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The Fastest and Most Careful Auto-
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Monogram Oil

They use it in their speed tests and in their endurance runs. It lubricates every second, giving the engine the least amount of resistance. It never clogs or smuts.

Can be had from all reliable dealers—insist on it

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"SPEED" CARBURETER

Solves the Carbureter
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Positively guaranteed to develop greater power, speed, flexibility and economy in the engine than any carbureter in the world or purchase price refunded.

You run no risk—try it—it will save you a world of trouble and make your cars better and more efficient. Write for full particulars.

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"Fisk Quality"

To help your understanding, ponder this letter:

THE HOUSATONIC RUBBER WORKS
Reclaimers of Uncured Rubber Scrap
The Fisk Rubber Company,
Chicopee Falls, Mass.

Gentlemen: Can you sell us a pair of your clincher tires, 30x3, for the use of one of the members of our company? We have reclaimed a great deal of tire stock during our 25 years as reclaimers, without finding anything quite as good as the material in your tires, which is the reason that moves us to try them. Very respectfully yours,

HOUSATONIC RUBBER WORKS,
Bridgeport, Conn., April 28, 1908. L. W. Wilson.

"Fisk Service" at branches in eighteen cities



ELECTRIC TAIL OR REAR LIGHT

Designed to be attached to number plate, or body of car. New—Novel—Can't Blow Out. Can be attached to sparking battery.

Write for Circular and Prices.

Sold by all dealers.
This lamp will be shipped to all parts of United States on receipt of money order.

SILVER, BRASS, NICKEL and
BLACK NICKEL PLATERS

Mfgs. of Electric Lighting Goods

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Est. 1870

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G. and C. Revolving Auxiliary Chair Seat

It revolves in any position, folds up, and is fastened to the tonneau by a special bracket so it is easily adjusted or removed.

Sold in the white or upholstered.

High Grade Bodies, Limousines and Taximeter Cabs our specialty.

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For



ZIMMERMAN AUTO RUNABOUT

1908
Model F



ZIMMERMAN MANUFACTURING CO., AUBURN, IND.
Chicago Agency, 1305 Michigan Avenue

CARTERCAR

THE CAR WITH THE
FRICTION DRIVE



No gears to strip
No clutch to slip
No grease packing
No noise
Only one lever

The most simple, practical, all-around serviceable car built for \$1,350

The Motorcar Co. Detroit, Mich.

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Catalogue

BUILT IN THE HILLS

WE USE THE
FAMOUS
RUTENBER
40 H.P. MOTOR



\$2,500

GLIDE PRICE IS THE MEASURE OF REAL CAR VALUE

Why pay more—except to satisfy price pride? If you do, what do you get for your money?

Motor—Selective Transmission, nor axles waste any power, therefore a Showing is made on hills in speed and through mud or sand.

Reliability has been established by owners touring from state to state, across the continent and in Europe. Our large gears defy breakage. Roller bearings eliminate friction. Continued satisfactory service is the result.

A car of comfort and perfect control. Write for catalog.
THE BARTHOLOMEW CO., 235 GLIDE ST., PEORIA, ILL.

3 TON

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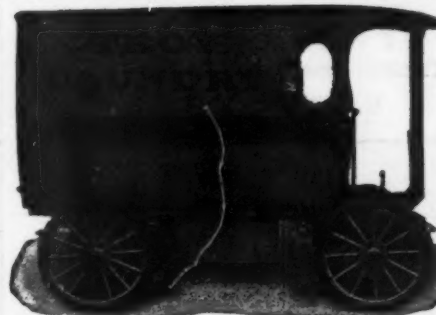
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"WE DELIVER THE GOODS"

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AMERICAN MOTOR TRUCK CO.
LOCKPORT, NEW YORK

THE GARFORD COMPANY, Elyria, Ohio



Parts for Power
Wagons.

Heavy and Light
Electric or Gasoline.

Equipment "L"
makes the best
Light Electric Delivery yet produced

Sold by THE AMERICAN DISTRIBUTING CO., American Trust Bldg.
CLEVELAND, OHIO.

1908—DORRIS—1908



Model C, 30-H.P.,

4 Cylinder

Price \$2,500.

THE CAR OF SIMPLICITY.

The days of large cars are over, why not buy a car that will take you everywhere, with less gasoline, general upkeep and tire expense?

DORRIS MOTOR CAR CO., St. Louis, Mo.

KISSEL CAR SAVES A THOUSAND DOLLARS

\$2000

car with the equipment of a
Three Thousand Dollar Car

4 cylinder, 40 H.P. Selective type transmission. Floating type rear axle. Timken roller bearings. Luxurious appointments.

Write today for catalogue.

KISSEL MOTOR CAR CO. HARTFORD, WISCONSIN.

The Battery of Never-Failing Dependability

RADIO

Ignition
Perfect

More
Power

Longer
Life

Fully
Guaranteed



Produces
Intense
Spark
like an
Electric
Flame

No Coking

No Metal
Parts

No Short
Circuit

Write for circular giving full particulars.
Agents wanted—Liberal terms. Write to-day.

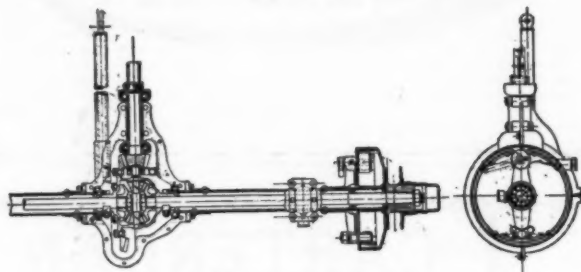
RADIO BATTERY CO

THOMAS S. WITHERBEE, General Manager
433 West 42d Street, New York

Light Runabout Axles



Type D-1



Type C-2

WITH THESE AXLES

under your car, you are free from axle troubles. They possess the recognized "Smith" quality and are guaranteed against defects in material and workmanship. Drawings and prices on request.

A. O. SMITH CO.,

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The K-W MAGNETO

MODEL F

Has bracket as shown* for attaching to frame of car. Made especially

FOR FORD RUNABOUTS

Good on any car.

High in Quality—Low in Cost
Perfectly Reliable—Easy to Apply
More Power—Less Fuel



PRICE, \$35.00

It starts the engine easily without batteries and runs it faster and better than any battery because it gives a hotter spark. They run in ball bearings and have no moving wires or brushes to give trouble and wear out. They are made to last and they do last. They are the cheapest that is good and there is nothing better at any price.

We also make high grade Coils and Plugs and the K-W Master Vibrator. Get our catalogue.

THE K-W IGNITION COMPANY

34 POWER AVENUE

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"DIAMOND"

On your Chain Orders and
Forget your Chain Troubles

That Diamond Chains are honestly good in every detail is proved by the fact that prominent auto builders keep right on using them year after year.

The side bars are just elastic enough to cushion blows. Every chain we turn out is tested and must come up to standard. Send for our booklet describing how this is done.

"Diamond" is the only chain that equals "Diamond." Made to fit every American Car.

Write for our free book about Chain Power Transmission

DIAMOND CHAIN & MFG. CO.

Capacity 8,000,000 ft. per year

230 W. GEORGIA STREET, INDIANAPOLIS, IND.

A SKIPPER

is he who holds the destiny of a ship in his hand. Ordinary Carburetors tend to cause more skipping than is generally credited to them, but



The BUFFALO

MECHANICALLY CONTROLLED CARBURETOR

will eliminate all such difficulties. No spring devices depending upon atmospheric conditions for their perfect operation in THE BUFFALO CARBURETOR. It is mechanically controlled.

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NATIONAL SALES CORPORATION
Factory Sales Manager
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"Pearl Glass"

MACBETH's triplex polished

Motor car lens mirrors

Perfect curvature—copper backed

Made of the celebrated "Pearl Glass"

Perfectly colorless

The best projector of light known

MACBETH, Pittsburgh

All kinds of glasses, clear and colored, for auto lamps



The "JEWEL 40"

THE "NON-SKIDDING" CAR

Specifications:

Hedgeland Equalizer or Non-Skidding Device.
Wheels 36".
Tires Diamond, Firestone, Goodyear,
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Wheel Base . . 120".

Tread 56".

Engine 4 cylinder, vertical.

Bore and Stroke 4 1/2" x 5".

Ignition Double, Bosch Magneto and

Connecticut Coil and Storage

Battery.

Lubrication . . Double, Six Feed Mechanical

and oil level pump in crank case.

Axles Timken.

Bearings Roller.

Body 7 passenger.

Write for Catalog.

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MASURY

SUPERFINE

AUTOMOBILE COLORS

AND

VARNISHES

MANUFACTURED BY

JOHN W. MASURY & SON

NEW YORK

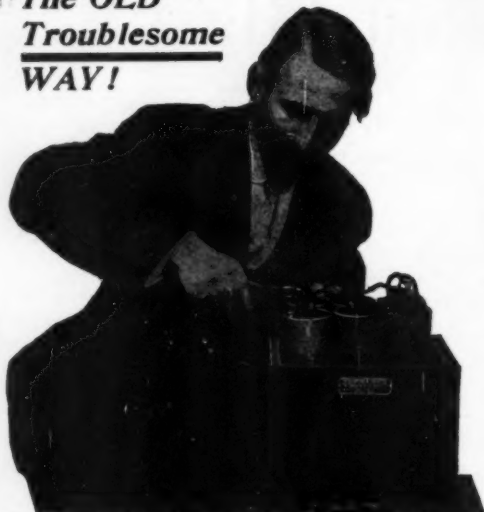
CHICAGO - ST. LOUIS - MINNEAPOLIS

— ESTABLISHED 1835 —

"You Screw The Battery In—We've Done The Rest."

(BATTERIES SCREW IN LIKE AN INCANDESCENT LAMP INTO SOCKET.)

*The OLD
Troublesome
WAY!*



\$6.⁵⁰

\$15.⁰⁰

AND UPWARDS.

BE SURE YOUR
CAR IS FITTED
UP WITH A
**WIRELESS
HOLDER**

Made also in 8, 12 and 16 Cell
Capacity.

PATENTED
UNITED STATES AND
FOREIGN COUNTRIES
OTHER PATENTS
PENDING



POSITIVE CONNECTIONS THAT CAN'T JAM LOOSE. EXHAUSTED CELLS can be removed without interrupting the Sparking Circuit—Cells cannot be connected up wrong even by a child. All Standard Dry Cells made to fit Holder, which is absolutely waterproof. Send for BULLETIN "A."

STANLEY & PATTERSON, Sole Mfrs.

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*The NEW
EASY WAY!*

At all Dealers

PATTERSON WIRELESS BATTERY HOLDER

MOTORS



AND
TRANSMISSIONS

Complete for all
Standard Cars.

For Quality, Capability, Durability, Cost
BRENNAN STANDARD MOTORS
ARE UNEXCELLED

2 CYL. MOTORS 12 TO 24 H.P.

4 CYL. MOTORS 20 TO 80 H.P.

Motors and transmission gears furnished complete on sub-frame or pressed steel frame. Four and six-cylinder chassis from 28 H.P. to 80 H.P., built to order. We can convince any manufacturer or individual owner who will investigate that there are no better made and that our motors and transmissions will give absolute satisfaction in every instance. Old cars rebuilt good as new.

Write to us—All correspondence promptly answered.

BRENNAN MOTOR COMPANY
SYRACUSE, N. Y.



"BREECH-BLOCK" PLUG

WITH IMPROVED CLIP AND HANDLE

FAR superior to all other Spark Plugs. Always has—always will—excel in every point of comparison.

THE MOST EFFICIENT, RELIABLE AND DESIRABLE

Eliminates your spark plug troubles—saves time, tools, temper and trouble.

BREECH-BLOCK CLIP WITH HANDLE may be nicely attached to fixed terminals with the accompanying screw and nut as shown above. The Breech-Block Handle is an insulator and is very convenient when testing spark or when removing clip from plug, also attaching the clip at right angles to the cable permits of an easier motion when disconnecting clip from plug.

If you are not particular, any old plug will do, but if you want the BEST Plug, a plug that is always dependable—INSIST on the "BREECH-BLOCK"

Write for full particulars or let us send you a sample Plug. **THE STANDARD COMPANY, Torrington, Conn.**

THEY ARE ALIKE—

The Magneto and the Atwater Kent Spark Generator

In the following particulars:

1. One spark only per explosion.
2. Positive mechanical contact maker—perfect synchronism.
3. Single coil and distributor (but the Kent coil and distributor are much more reliable than those of the magneto).

Where, Then, Do They Differ?

Simply in the **source of current**. But that fact carries several others with it.

1. With the Atwater Kent Spark Generator, the source of current is constant regardless of speed, and is there even when the engine is not running. Therefore you can start on the spark.
2. With the magneto, the source of current is **nil** when standing. No matter how big the engine may be, it must be "spun" to start it, and running "dead slow" in high gear is out of the question unless the road is very smooth.
3. In principle and construction, the Atwater Kent Spark Generator is simplicity itself. How about the magneto?

"So far as my experience goes, I consider the Atwater Kent Generator the most reliable and least troublesome of any device I have ever used."—J. B. Erskine, Tilton, N. H.

Atwater Kent Manufacturing Works 44 NORTH SIXTH ST.
PHILADELPHIA, PA.

\$2,500 \$3,000 \$3,750

HAYNES

Kokomo, Ind.

TINCHER



GUARANTEED AUTOMOBILES

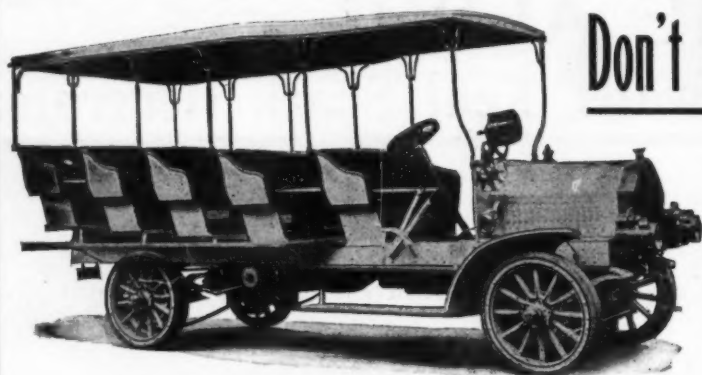
A car up-to-date in every modern style and improvement—a car possessing all the points that promote all-the-year-round satisfaction.

Price, \$6,500
and worth every cent of it.

Write for full particulars

Tincher Motor Car Co.
SOUTH BEND, INDIANA
Chicago Branch:
1218 Michigan Ave.



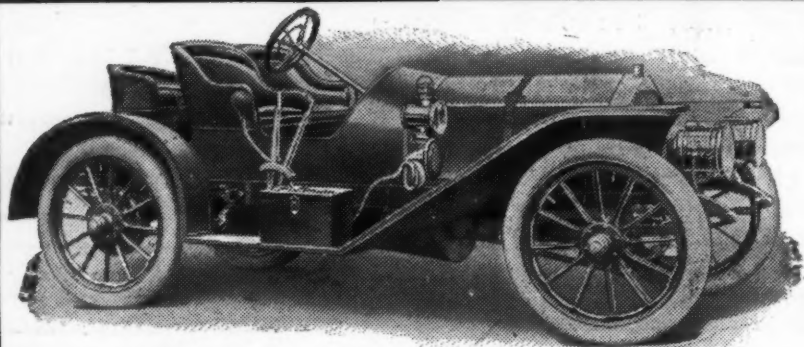


4-Cylinder, 35-40 H.P., 20 Passenger Sight Seeing Car.

Don't Experiment with Commercial Cars

The hardest auto service in the world requires the very best equipment to be had. We are the oldest manufacturers of Commercial Cars. Our machines embody only the best construction in this line.

AUTO CAR EQUIPMENT CO., Manufacturers
87 Edward Street, BUFFALO, NEW YORK



Pullman
AUTOMOBILES

"4-40" Roadster

The Car That Won
PHILADELPHIA to SAVANNAH
RUN

YORK MOTOR CAR CO., YORK, PA. Makers of the "PULLMAN"

All Models—Prices: \$1,875 to \$3,500



M & M Tire Repair Outfit

Keep one constantly in your machine; it will save you time, money and worry

An M & M Outfit will save you 75 per cent. of your tire bills

BY THE USE OF

M & M Cement and Acid Cure Solution

inner tubes can be instantly and permanently repaired. The acid cures the cement to the torn part making one solid piece of rubber which it is impossible to separate without tearing.

NO HEAT REQUIRED—A NOVICE CAN MAKE HIS OWN REPAIRS

M & M is the simplest and most effective vulcanizing substitute for any puncture or leak in either inner tubes or outer casings.

FOR SALE BY ALL DEALERS AND JOBBERS

THE M & M MFG. CO.

AKRON, OHIO



The Carbureter question is one of more than ordinary importance. Here is a carbureter that will prove a better one no matter how good a one you now have.

The "Marvel" is an improvement on all others, embodying their good points and eliminating every objection heretofore common to most carbureters.

It's the Carbureter You Must Have if You Want the Best

Its principal features are: ease of adjustment—good mixture at all throttles—absolutely non-dripping, thus saving of gasoline—extremely great range—unsurpassed workmanship—reasonable prices—and absolute guarantee of satisfaction or money refunded.

In your own interest write for full particulars and prices

MARVEL MFG. CO., 410 So. Meridian St., Indianapolis, Ind.

A car that has *quietly* taken its place among the leaders. The reliable

Studebaker

General Office

CLEVELAND, OHIO

Factory at

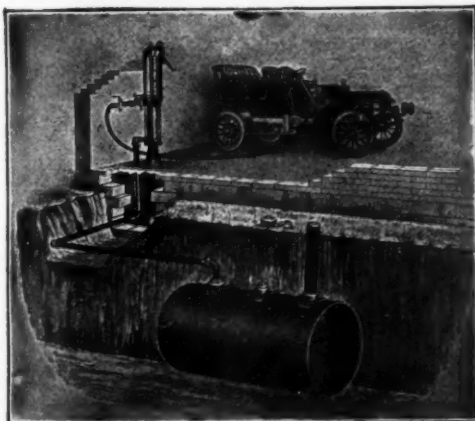
SOUTH BEND, IND.

APPERSON CONSTRUCTION

In the building of "Famous Apperson Cars" no freak ideas are incorporated. Their universal supremacy is due to the employment of correct mechanical designs and ideas that have been developed by practical automobile mechanics and engineers during the fifteen years that the Apperson Bros. have been solely engaged in developing and building high grade motor cars. Apperson Bros. have had more experience in this line of manufacture than any other builder in America. In motor car construction it is experience that counts.

Dealers should investigate our New Model O which will sell at a low price.

APPERSON BROS. AUTOMOBILE CO., KOKOMO, INDIANA



Cut 41—Long Distance Outfit. The Standard Garage Equipment for Gasolene Storage.

Stronger Gasolene

Wouldn't you like to have stronger and purer gasolene to use in your automobile? It would mean that your carburetor troubles would be practically over, and that your car would go farther and faster on less gasolene.

A BOWSER GASOLENE TANK

prevents all evaporation and keeps out all dust and dirt. Consequently, your gasolene will be kept as pure and strong as when it left the refinery.

Aren't these points worth looking into?

It costs you only a cent to learn more about the Bowser. Send a postal for catalog J.

S. F. BOWSER & CO., Inc., Fort Wayne, Ind.

255 Atlantic Ave.,
Boston

50 Church St.,
New York

Fisher Bldg.,
Chicago

612 Howard St.,
San Francisco

66-68 Frazer Ave.,
Toronto

TOURING CARS

\$ 3000.

ROADSTERS

MOON

MOTOR CAR CO. St. Louis

JOSEPH W. MOON PRES.

Matheson



ONE YEAR GUARANTY

Our purpose has been to build the best car in all the world. How well we have succeeded is told by our customers themselves, who, as a class, are the most prominent men of affairs in this country. Send for our complete catalogue and book of customers' letters, of which the following is but one:

ANDOVER, MASS., January 7, 1908.
In reporting on the work of my Matheson for the season, I have to say that it has come nearer being the ideal touring car that I have been eight years hunting for than anything else I have had. It has speed over sixty miles per hour with five people aboard and power on the hills and yet runs slowly without fuss or bother in traffic in towns—eight miles per hour being easy, smooth and comfortable. It rides easier and has cost less for repairs than any of the twenty-two (22) cars I have previously had and I have driven it 23,000 miles since I got it June 7th last and to day I think I drove it faster than any time before, over sixty miles per hour with five passengers. It is by far the easiest car on tires I have ever had. One tire made 11,800 miles, one 8,800 and the others from 4,000 up.

I know you will be as glad to hear as I am to tell of the satisfaction I have had with the car.

(Signed) HARLAN W. WHIPPLE.

Note.—There is no better known or more exacting motor car enthusiast and sportsman in this country than Mr. Harlan W. Whipple, ex-president of the American Automobile Association



Dealers

NEW YORK CITY.....A. G. Southworth Co. Inc., 1733 Broadway.
BOSTON MASS.....Matheson Co. of Boston, 1230 Massachusetts Ave., Cambridge, Mass.
CHICAGO, ILL.....Bird-Sykes Co., 1470 Michigan Ave.
PHILADELPHIA, PA.....Noblit & Fassitt, cor. Broad and Cherry Sts.
PITTSBURG, PA.....Matheson Agency, 41 Leader Building.
BALTIMORE, MD.....Matheson Co. of Maryland, 1005 Morton St.
SAN FRANCISCO, CAL.....Matheson Co. of California, 442 Golden Gate Ave.
ST. LOUIS, MO.....South Side Auto Co., 2339 S. Grand Ave.
ALBANY, N. Y.....Albany Garage Company, 28-30 Howard St.
BINGHAMTON, N. Y.....H. D. Clinton Auto Co.
FORT WAYNE, IND.....Straus Bros. & Company.
MIDDLETOWN, N. Y.....Empire Garage Company.
PORTLAND, ORE.....H. L. Keats Auto Company, 80-82 Seventh St.
ROCHESTER, N. Y.....Rochester Automobile Company.
WILLIAMSPORT, PA.....Rothfuss-Howard Iron Works.
LONG BRANCH, N. J.....Long Branch Auto Co.

Dealers are wanted in all localities where we are not now represented

Matheson Motor Car Co.

Makers

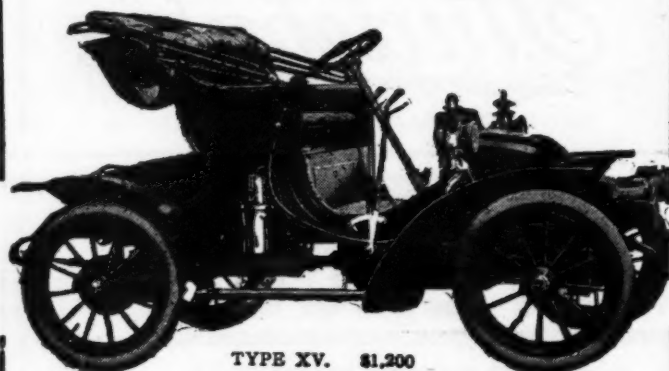
Main Office and Factory,

WILKES-BARRE, PA.

(Licensed Under Selden Patent)

The Autocar

BUILT BY BRAINS —FOR— MEN WHO KNOW



TYPE XV. \$1,200

The general use of this car by physicians in making their daily rounds has earned for it the well deserved appellation

THE DOCTOR'S CAR

This car comes to you with full equipment, including top, storm apron, gas lamps and generator. It is the easiest car to care for and the most economical to run.

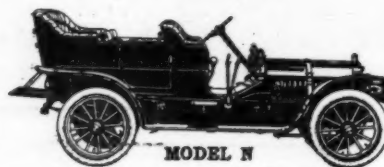
The AUTOCAR CO., Ardmore, Pa.

Member A. L. A. M.

National

MOTOR CARS

afford the purchaser the very best value to be had on the market at present. All Nationals are equipped with ball-bearings throughout, including the motor.



MODEL N

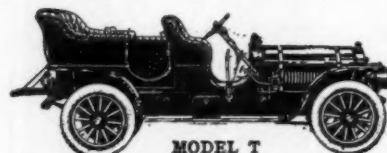
Model K, 4-cyl., 4 1/2 x 5
\$3,500

Model N, 4-cyl., 5 x 5
\$3,700

ALL NATIONALS HAVE TWO COMPLETE SYSTEMS OF IGNITION

Model R, 6-cyl., 4 1/2 x 4 1/2
\$4,200

Model T, 6-cyl., 5 x 5
\$5,000



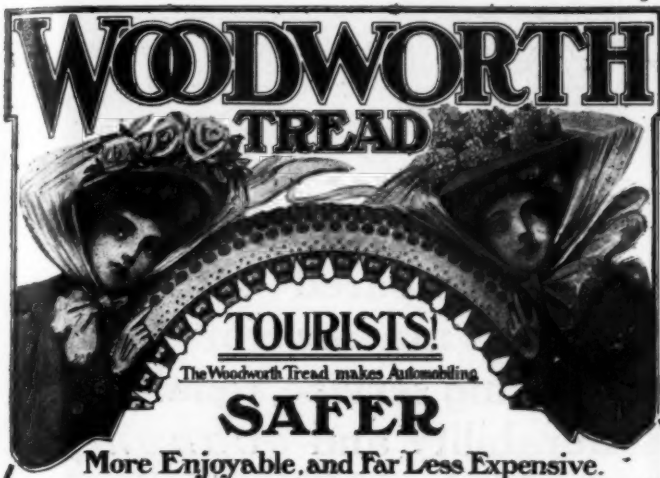
MODEL T

Write for particulars and our Booklet
"What Owners Say About Their Nationals"

NATIONAL MOTOR VEHICLE CO.

1000 East 22d Street

INDIANAPOLIS, IND.



**WOODWORTH
TREAD**

TOURISTS!
The Woodworth Tread makes Automobiling.

SAFER
More Enjoyable, and Far Less Expensive.

Prevents accidents, makes the tire last longer, saves more than half the tire bill, protects the car and protects the tourist against injuries and expensive and perplexing delays.

Every tourist should see that his car is fully equipped with Woodworth Treads. It will be money in his pocket and make his tour a happier and more comfortable one. His car will not skid on muddy and slippery roads and his tires cannot be punctured when they encounter sharp stones and glass and the rutty, rocky and general unevenness of the country road over which he travels.

The Woodworth Tread will not stretch or crack in any kind of weather or hard usage. It positively will not chafe or heat the tire but on the contrary tends to cool it.

The first and most successful tire protector made. Many imitators. No equals.

Prices \$8.00 to \$25.00, each according to size.

THE WOODWORTH SPECIAL TREAD.
For rough and rutty roads a special tread is made with oval headed steel rivets set closely along the sides to take the wear and tear of rough, rutty roads and sharp stones. Special treads 20% additional.

Send for new catalogue.

LEATHER TIRE GOODS CO.
NEWTON UPPER FALLS, MASS.

**HERE is proof that
the entire country
is awaking to the
structural operative
and economical ad-
vantages of the**



Over Any Other Car

Elmore Town Car \$2,250.00
Elmore Taxicab - 2,250.00

In spite of the fact that ours is the only factory in America to increase its output over 1907, almost every Elmore agent is confronted with a shortage of cars.

Not only would most of the agents gladly pay a premium for more cars, but we have been compelled for two months to refuse requests for new agencies and requests from our larger dealers for an increased allotment of cars.

Surely this condition should prove beyond question the fact that the entire country is awaking to the structural, operative and economical advantages of the valveless, two cycle Elmore over any other car. The time is past for an argumentative discussion of these advantages. They have of themselves pushed the Elmore into a position which makes it the most-talked-of car in the automobile world to-day.

Elmore Manufacturing Co.

1304 Amanda Street
CLYDE - OHIO

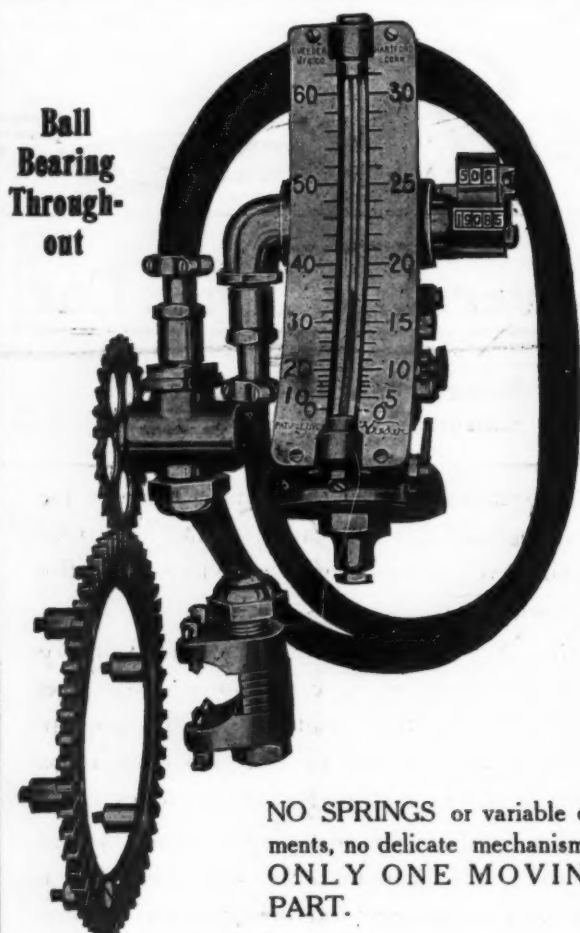
"It's nice to know how far you go;
And this will show the Speed,—also."

Veeder (TACHODOMETER)

THE SCIENTIST'S SPEED INDICATOR

Registers how far, total, and for each trip. Double scale shows each speed at all times, from zero to 62 miles per hour.

**ONLY SPEED INDICATOR THAT CAN BE ACCURATELY
SET TO ZERO AT ANY TIME BY THE OWNER.**

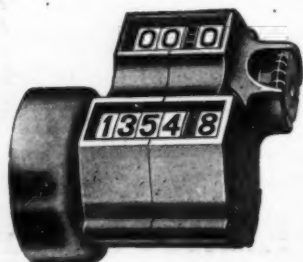


Price, complete, ready to
put on any car, \$75.00

Thousands of Veeder
Odometers in use to one
of any other make.

The Veeder Mfg. Co..

Sargeant St.,
HARTFORD, CT.



FORM D or DASHBOARD ODO-
METER. Complete with flexible
shaft and attaching fixtures, ready
to put on any car, \$20.

MICHELIN

FRANCE. ENGLAND. ITALY. AMERICA.

**Whenever Michelin tires
are compared with any
other makes for good
wearing service, reliability,
durability and *economy*,
the lead of Michelins is al-
ways emphasized, and here
are some *reasons why*.**

In 1895 Michelin made the first successful automobile tires ever constructed. Our entire time and attention ever since have been devoted to building tires and tubes only, and not divided among various lines of rubber products.

Michelin tire quality proves that concentration counts, by winning every important contest in Europe and America in which they participate. Michelins get harder usage in these events than you can ever give them, and they invariably withstand it successfully.

Don't you think we know something about tires when you consider that to September last we had made 1,180,830, or tires enough to equip 26,837 automobiles, each and every year since 1895?

In spite of the fact that Michelin tires cost a trifle more than others, more than half the cars in Europe are equipped with them, because the car owners can get no other tires to give the Michelin's economy and satisfaction of service.

**Isn't it about time that you equipped
some of *your* cars with Michelins to
show your customers that in EVERY
particular your car is the BEST in its
price and class?**

**MICHELIN TIRE COMPANY
MILLTOWN, N. J.**

NEW YORK, 1763 Broadway BOSTON, 895 Boylston Street
CHICAGO, 1344 Michigan Ave. BUFFALO, 908 Main Street
DETROIT, 247 Jefferson Ave. SAN FRANCISCO, 308 Van Ness Ave.



Thanks to AJAX
quality,
it doesn't cost us
one per cent.
to back up
the guarantee
that goes
with
every AJAX
tire—5,000 miles
of
road service.

Do you know
any cheaper
or
more effective
advertising argument
than that?

Or
any better
recommendation
for a tire?
Puts
the burden of proof
on us—
relieves you
of all risk when you
buy AJAX tires

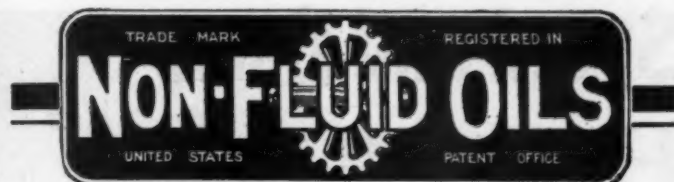
Write for copy of Guarantee, stating what size tire you are using.
Address Dept. C.

AJAX-GRIEB RUBBER COMPANY

GENERAL OFFICES: N. E. Cor. 57th Street and Broadway, New York
Factories: Trenton, N. J.

BRANCHES:

New York, 1776 Broadway
Boston, 819-a Boylston St.
Chicago, 1418 Michigan Ave.
Detroit, 743 Woodward Ave.
Denver, 1529 Cleveland Place
Seattle, 1102 Broadway
San Francisco, 460 Golden Gate Ave.
Los Angeles, 1040 S. Main St.
Agents in all large cities.



THERE IS A FUNDAMENTAL ERROR IN THE USE OF GREASE FOR LUBRICANTS

This lies in the simple fact that grease requires the aid of frictional heat to melt it, before it even begins to lubricate. The harder the grease, the greater the frictional heat required to soften it. Friction between metals always means loss of power and fuel and increased wear and tear.

The original excuse for grease was the waste and muss from the dripping away of fluid oils. It is nearly impossible to keep bearings lubricated with fluid oils because so much is wasted. This practical difficulty and loss is inseparable from the use of ordinary lubricating oils.

THERE IS NO FUNDAMENTAL ERROR, NO PRACTICAL DISADVANTAGE IN

NON-FLUID OILS

Their non-fluid character avoids the muss, the waste, the trouble, the unreliability of fluid oils. They are oils—not greases—and begin to lubricate the instant a shaft begins to revolve in its bearings. Theory approves the Non-Fluid Oil idea; practical experience fully confirms the theory.

We're bound to have some good hot weather soon—hot days when grease becomes soft and sloppy and leaks away like oil, spattering the car and causing untold muss and trouble. Non-Fluid Oils remain the same—summer and winter.

A test is the best proof. Try NON-FLUID OILS. Dealers everywhere keep them. Go to your dealer for a trial order of genuine NON-Fluid Oils, but in buying be sure to look for our name and trademark, or you may get a poor imitation under a similar name.

Originators and Sole Manufacturers of Non-Fluid Oils

NEW YORK & NEW JERSEY LUBRICANT CO.

Dept. F, 14-16 Church Street, New York City



K. No. 00

SPECIAL

For Sliding Gear
Transmission.

K. No. 000

For differentials,
axles, etc., and
general use in
compression cups.

Speed and Lamp Equipment

are closely related. The higher the speed, the greater must be the distance visible, in order to give time for stopping or turning when an obstruction is met. To save a few dollars on the headlights is the poorest of economies, for it robs night driving of its pleasures and virtually limits one to daylight use of his car.

The searchlight should be at least a size larger than the headlights, since its function is not simply to light up the road around bends, but to supplement the headlights by its longer and more concentrated beam. For the highest speeds, it is well to carry a pair of 6 inch gas lamps as side lights. We furnish these on special order with one flat socket, rights and lefts.

With an adequate lamp equipment, night motoring becomes absolutely delightful. Thousands of Rushmore owners have already learned this, and the growing demand is already taxing the capacity of our enlarged factory.

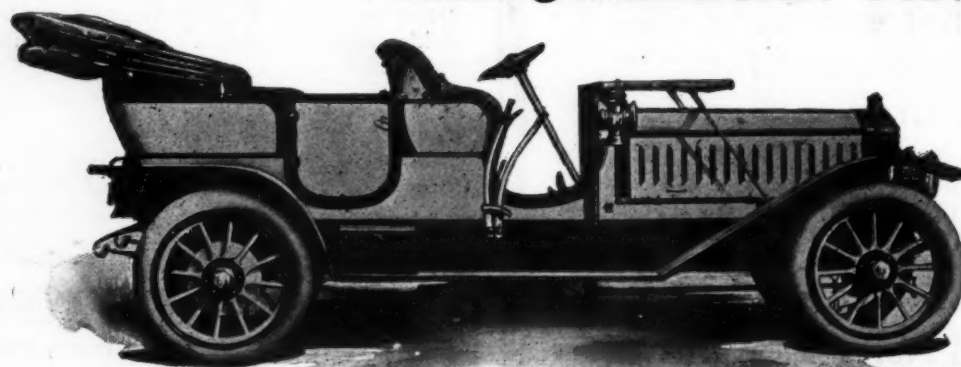


Reading a guide post by the searchlight. The car in the photograph is equipped with Rushmore Headlights and Searchlight, and Automatic Shaking Grate Generator.

RUSHMORE DYNAMO WORKS PLAINFIELD, N. J., U.S.A. - LONDON, PARIS, CHICAGO

"AUSTIN"

THE AMERICAN FAVORITE



MODEL XC-T

The highest powered touring car on the market, 7 to 90 miles on the direct drive.
More of the AUSTIN built under one roof than any other American car.

1908 "Austin" Cars

Model XC-T, 90 H.P. Six Cylinder Touring car.

Model XC-R, 90 H.P. Six Cylinder Combination Roadster.

Model XC-L, 90 H.P. Six Cylinder Detachable-Top Limousine.

Model LX-T, 60 H.P. Four Cylinder Touring Car.

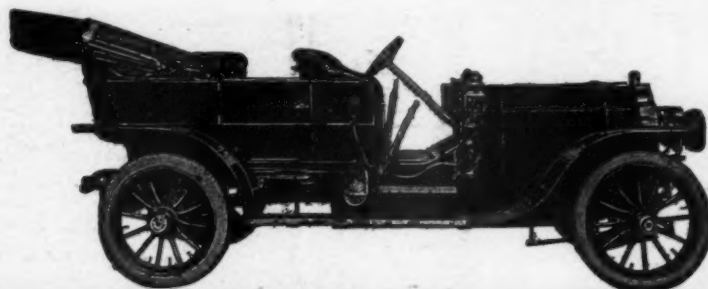
Model LX-R, 60 H.P. Four Cylinder Combination Roadster.

Model LX-L, 60 H.P. Four Cylinder Detachable-Top Limousine.

WRITE FOR DESCRIPTION AND DISCOUNTS

AUSTIN AUTOMOBILE CO.,

Grand Rapids, Mich.



"AN AUTO ARISTOCRAT"

Whether running at high speed or low speed it's always the same with the *Gearless*—Silent, Comfortable, Reliable. Furthermore, there is no jerking or jarring when speeds are changed, for there are no gears to be thrown in and out. This feature supplemented by the wonderful flexibility of *Gearless* engines and the entire absence of vibration makes it possible to run *Gearless* Cars in the traffic of crowded city streets with as much ease and comfort as on the deserted country road.

Gearless Cars also have that snappy, stylish, trim appearance which appeals so strongly to those who really "know." ¶As to power—there is plenty of it, and to spare for every occasion. ¶These are the reasons why the Gearless is "JUST A BIT BETTER"

Write for catalog and name of nearest dealer. **GEARLESS MOTOR CAR CO.** 295 Plymouth Ave., Rochester, N.Y., U.S.A.
Standard Mfrs. A.M.C.M.A. New York Representative: A. L. Ruland, Temp. Quarters 2 E. 58th St.

PERFECT SCORES FOR TWO STEVENS-DURYEA LIGHT SIXES

In the 174-mile Endurance Run of the Automobile Club of Hartford, May 16th, over Hartford-Waterbury Route, the Touring Car with four passengers averaged

15 1-7 MILES PER GALLON OF GASOLINE

WINNING

THE GASOLINE CONSUMPTION TEST

FOR CARS OVER \$3000.00

WRITE FOR SIX-CYLINDER LITERATURE

STEVENS-DURYEA CO.

900 MAIN ST.

CHICOPEE FALLS, MASS.

MEMBER A. L. A. M.

He Owned a Portable Gas Factory!

He didn't seem to be able to make the thing work. It flared up and ruined his lamps. Or it died down and left him where Moses was.

But he kept on fooling with it, getting out of his car and puttering around in the dark, cleaning it, adjusting it, and getting poor light all the time.

He was saving money—maybe three or four whole dollars in a year—maybe not that much.

Prest-O-Lite
Gas Tank THE NEW SIZE \$20

One night, for no apparent reason, his lights went way down.

When his car came back from the repair shop, he bought a Prest-O-Lite Gas Tank.

A flood of steady, white, dependable light, turned on and off like a gas jet. Supplies two $\frac{1}{4}$ -foot burners for 60 to 200 hours, depending on size of tank. Simply exchange an empty tank (dial shows when) for a full one.

The dealer who sends his customers elsewhere for Prest-O-Lite Tanks is apt to envy his competitor.

THE PREST-O-LITE CO.

Write the nearest main station.

New York.....1074 Broadway
Boston.....607 Boylston St.
Indianapolis.....220 E. 5th St.
San Francisco.....Point Richmond
Toronto.....6 King St. W.

1600 REFILLING STATIONS

CAUTION:

When exchanging an empty tank, don't let anyone sting you with an imitation that can't be refilled promptly or can't be sold at a good price.

**Always Look
at the
Name-Plate**



"WHICH DO YOU PREFER"

To ELIMINATE THE HORSE or not, with the attendant annoyance and expense?

The car in picture is 60 H. P., equipped with a common differential. It makes one wheel dependent upon the other for power. When one wheel has little or no adhesion on the road, you are **STALLED**. The Hedgeland Equalizer drives both wheels positively, eliminates the horse and the tow line.

THE FOREST CITY MOTOR CAR COMPANY.

Manufacturers Jewell Automobiles.

Massillon, Ohio, Feb. 28, 1908.

Hedgeland Mfg. Co.
Canton, Ohio.

Dear Sirs:—Going to Cleveland a few weeks ago, and running around a horse and phaeton, we went into a ditch with our right end rear wheel up to the hubs in soft mud. We pulled out of this without a particle of trouble, and can conscientiously say your Equalizer is the best thing of the kind we have seen.

Yours very truly,
FOREST CITY MOTOR CAR COMPANY,
H. A. Croxton, Pres. and Treas.



THE QUEEN CITY PRINTING INK CO
H. E. Delbare, Manager.

Chicago, Oct. 17, 1907.

If there is one thing about the car that gives me more satisfaction and pleasure than any other, it is the way your device pulls through mud and out of mud holes and the absence of skidding on slippery pavements.

Yours very truly, H. E. Delbare.

JONES IMPROVED LOOSE LEAF SPECIALTY COMPANY.

Chicago, Ill., Oct. 31, 1907.

Many times the Hedgeland Equalizer has enabled me to pull through mud-holes where forty and fifty horsepower with Differential Axles were being pulled through by a farmer.

Very truly yours, Harry S. Jones

The Hedgeland Equalizer is readily installed in twenty-two makes of cars. If you are buying a new car, insist upon it; if you already have a car, make a change. It is a life-saver, tire saver, nerve and power saver. **WRITE US FOR LIST OF CARS FOR WHICH IT IS MADE.**

HEDGELAND MFG. CO., - CANTON, OHIO



Diamond
TIRES
ARE THE BEST
CASINGS • TUBES

Diamond

THE DIAMOND RUBBER CO. AKRON, OHIO

Moline "1909"

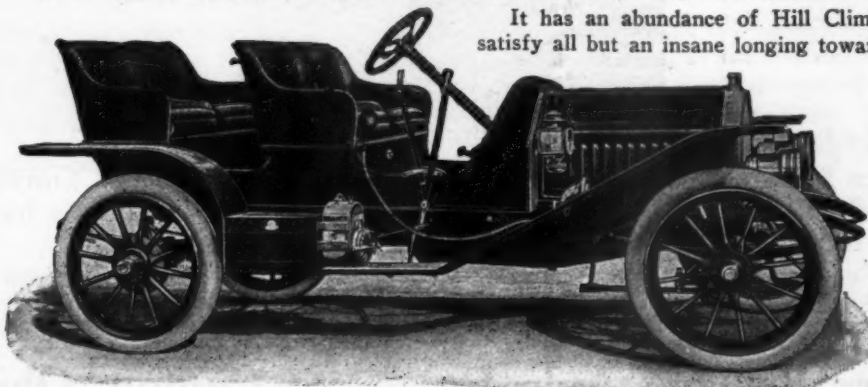
HAVE YOU CONSIDERED

The supreme sense of satisfaction to be derived in owning a car admirably suited to meet the requirements of the experienced motorist who, realizing the disadvantages experienced in the maintenance of the high-powered car can not but favorably look upon the well-made and properly designed machines of medium power and weight, eliminating the terrific cost of up-keep.

The "Moline" Roadster is light, flexible and beautifully designed to please in every way the most fastidious.

It has an abundance of Hill Climbing ability and speed enough to satisfy all but an insane longing toward the hazardous.

On the road this car runs smoothly and quietly, uninterrupted by the change of gears and sensitive in the highest degree to the wishes of its driver.



Moline
Automobile Co.

EAST MOLINE, ILL.

Members A. M. C. M. A.

BRILLIANT RECORDS OF VARIOUS TIRES

are always interesting. But not so interesting to *you* as the genuine assurance that the tires you buy shall be the kind that make the records good. Our unequaled factory efficiency makes impossible a single flaw in the entire output of

PENNSYLVANIA Clincher Tires

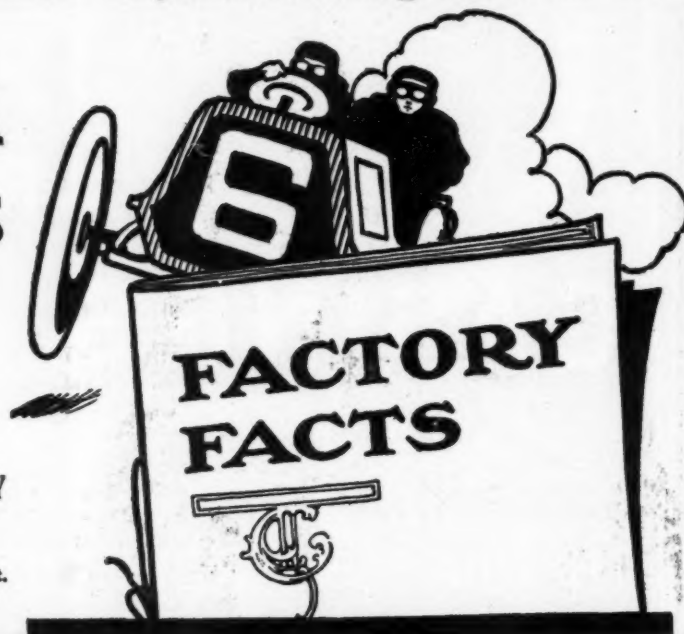
How we alone have achieved this, we tell in detail in "*Factory Facts*," our new book. Write for it and read it.



PENNSYLVANIA RUBBER COMPANY
JEANNETTE, PA.

BUFFALO: 717 Main Street
DETROIT: 237 Jefferson Avenue
SAN FRANCISCO: 512 Mission St.
NEW YORK: 1741 Broadway

CLEVELAND: 2134-6 East Ninth St.
CHICAGO: 1241 Michigan Avenue
BOSTON: 167 Oliver Street



The Severest Tests

have demonstrated time and time again that the principles employed in **Timken Roller Bearings** are the only correct ones that insure perfect transmission of all power to traction use, eliminating both friction load and end thrust.

A **Stoddard Dayton** Stock Car equipped complete with **Timken Roller Bearings** finished April 12th, a ten-day century run, 1,000 miles over the roughest roads with all adjustments sealed, something impossible for a car equipped with the ordinary type of bearings to perform.

This car, as are all cars of the **Stoddard Dayton** make, carries a full equipment of **Timken Roller Bearings**, as tests made under the most adverse and severe conditions have proven them an economical factor in the saving in wear and tear from strain alone.

And these are some of the reasons why more than 65 per cent. of all the makers of high grade American Automobiles and over 90 per cent. of the Commercial Truck builders are now using them.

Are you? If not, won't you let us give you some figures that prove? These are yours for the asking.



The Timken Roller Bearing Axle Co., - Canton, Ohio

Branches: 10 E. 31st Street, New York. 429 Wabash Avenue, Chicago

OVERLAND VICTORIES

Overland cars do not have to rely on past performances. Each event in which they are entered adds to their list of victories. The following list of recent events should interest every intending purchaser:

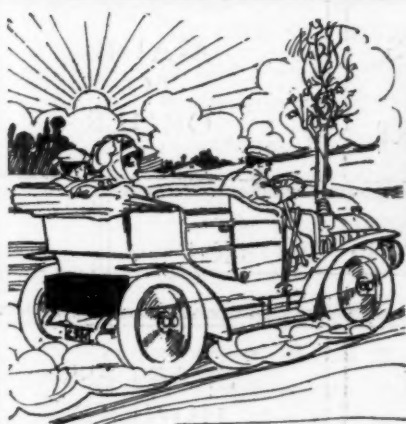
Indianapolis Hill Climb, March 24, '08.....First Prize
Fort George Hill Climb, April 9, '08.....Second Prize
Indiana Reliability Run, May 20, '08.....Perfect Score
Cincinnati Hill Climb, May 3, '08.....Second Prize
Bridgeport, Conn., May 3, '08.....First and Second
Williamsport, Pa., June 6, '08.....Two Firsts

You take no chances when you buy the OVERLAND. Every car is built right to the smallest details. 20-22 h.p., 4-cylinder, shaft drive, 96-inch wheel base, full elliptic springs, transmission and differential in one housing on rear axle, NO SIDE LEVERS. Write for catalogue.

AMERICAN MOTOR CAR SALES COMPANY

FACTORY SALES AGENTS FOR AMERICAN, MARION AND OVERLAND CARS

INDIANAPOLIS, IND.



FOR THE TOURIST

who desires "all the comforts of home" en route, a John Boyle Trunk is a necessary equipment—affords ample accommodation for anything he or she may wish to carry—every requirement of toilet and dress and other necessities in one roomy, safe, sure—under lock and key—water-proof and dust-proof trunk, strapped out of your way at the rear of the car. Easily opened en route. At your destination unstrap from car and send into your rooms. Gives pleasure, comfort and satisfaction to all tours; **you know you are ready for any emergency regardless of weather changes or stop-overs en route.**

JOHN BOYLE TRUNKS

are light—compact—capacious—accessible—inexpensive—reliable—weather-proof—dust-proof and indestructible, and present a handsome appearance. They are built with especial view to the use intended and are strong to withstand the roughest usage, yet light to avoid overweighting the car. Their **Quality** and **Price** make them the most inexpensive you can buy.

Write for Style Book and Prices for the various makes of cars

John Boyle & Co., 112-114 Duane St. New York 70-72 Reade St.

Are You Quite Satisfied?

IMPORTED
DIE
FORGINGS

CHROME NICKEL STEEL!
CHROME VANADIUM STEEL!
SPECIAL AUTO STEEL!

FOR ALL
AUTOMOBILE
PARTS

COST LESS THAN CASTINGS IN THE FIRST PLACE!

ROUND
BARS
ALL
SIZES

CHROME NICKEL STEEL!
CHROME VANADIUM STEEL!
SPECIAL AUTO STEEL!
SPECIAL GEAR STEEL!

MILL LENGTHS
OR CUT OFF
TO SUIT
PURCHASERS

DO NOT HANDLE INFERIOR STEEL AT ALL!

DESIGNS
AND
DRAWINGS

OF MOTORS, TRANSMISSIONS
CHASSIS
OR OF OTHER PARTS OF CARS

MADE
TO
ORDER

AT A FIXED PRICE FOR GUARANTEED WORK!

EXPERT
ATTENTION
GIVEN

TO THE INVESTIGATION OF
AUTOMOBILES, THEIR
MATERIALS OR QUALITY

FEARLESS
HONEST
OPINION

A STITCH IN TIME SAVES NINE!

J. M. ELLSWORTH,

Automobile Engineer,
30 Pine Street,
NEW YORK

FRANKLIN Automobiles

Excessive weight cannot make an automobile strong nor safe. But it makes big bills.

The Franklin Model "H" touring-car is unique among automobiles. It weighs less than 2,600 pounds. It has 42 horse-power. Its engine is a six-cylinder. It carries seven passengers comfortably. Yet it is lighter than any standard five-passenger, water-cooled automobile.

Consider what that means in net power, and ability on American roads. Consider the economy.

Type "H" is faster than any touring-car of anywhere near its power. It has large wheels and tires; and like all Franklins, it has full elliptic spring-suspension and laminated wood frame—making its riding qualities comfortable and easeful beyond comparison. No shock to the passengers; no racking of the machine. And you can steer it with one hand.

A heavy automobile pounds heavily on the road—that means rapid wear-and-tear and discomfort. It is harder to control—that means danger. And the running-cost and depreciation-cost are unreasonable.

The Franklin air-cooled engine not only gets rid of weight, but of trouble and complication. It economizes fuel wonderfully; and it cools perfectly, even running idle—a thing no water-cooled motor will do.

Type "H" is the handsomest touring-car on the market. Its body of sheet metal is a work of art. No Franklin has the cheap wood body nor the heavy cast body. And you never knew a Franklin to wear out.

Before you buy any automobile see it weighed and test its strength.

16 h.p. 4-cylinder Runabout \$1750	28 h.p. 4-cylinder Touring-car or Runabout \$2850
16 h.p. 4-cylinder Touring-car 1850	42 h.p. 6-cylinder Touring-car or Runabout 4000
Prices f. o. b. Syracuse	

Write for catalogue describing the Franklin.

H. H. FRANKLIN MFG. CO. Syracuse, N. Y.

Rambler

MODEL 248



Price \$1,800. With tonneau, \$1,900.
Fully equipped with five lamps, generator,
horn and tools.

HERE IS AN UNUSUAL CAR

FOUR cylinders—full 30 horse power—adjustable roller bearing transmission—transmission gears made of special steel that will neither mar nor chip; floating type rear axle; full elliptic rear springs.

With tonneau, a complete touring car; full size; five passenger capacity; 108-inch wheel base; 34-inch wheels and 4-inch tires.

Quiet, powerful, flexible and handsome.

Tested by three seasons continuous service and perfected by the knowledge gained from twelve thousand Ramblers in daily use.

Where else can you obtain similar value—size, power, efficiency, reliability, appearance and comfort?

Write to-day for the special 248 page catalog and complete particulars.

THOMAS B. JEFFERY & COMPANY

Main Office and Factory, KENOSHA, WIS.

Branches and Distributing Agencies:

CHICAGO

MILWAUKEE

BOSTON

PHILADELPHIA

SAN FRANCISCO

WHITE WINS

A Partial Summary of Victories, May, 1907-May, 1908

PERFECT SCORE IN HARRISBURG ENDURANCE RUN

Tying with three other cars in the contest of May 5th-6th, 1907. For the result of the "run-off," see below.

FASTEST TIME IN WILKES-BARRE HILL-CLIMB

Defeating 45 high-powered gasoline cars, in the great contest on Decoration Day, 1907.

FASTEST TIME IN CLEVELAND HILL-CLIMB

Defeating 40 high-powered gasoline cars.

FASTEST TIME IN CALIFORNIA HILL-CLIMB

Defeating the fastest of its gasoline competitors by nearly two minutes on the 2 7-8 mile hill at Witter.

PERFECT SCORES IN SEALED BONNET CONTEST

Both White cars entered made perfect scores in this contest conducted by the Automobile Club of America.

OFFICIALLY OBSERVED NON-STOP RUN OF 1871 MILES

Held under the auspices of the Royal Automobile Club of England and certified by that organization.

FASTEST TIME OF THE SEASON ON THE TRACK

One mile in 1:02, ten miles in 12:54 and twenty-five miles in 29:07 at the Santa Rosa Track Meet.

OFFICIALLY DECLARED MOST EFFICIENT CAR

In the South Harting hill-climb, conducted by the Royal Automobile Club, the White won the contest because it developed at the rear wheels a greater percentage of its assigned horse-power than did any other car. The rating assigned to the White was 50 horse-power.

WINS ENGLISH DUST TRIALS

Proving officially that it raises less dust than any other car.

CLEAN SWEEP IN THE GLIDDEN TOUR

Three White entries make three perfect scores.

WON HOWER TROPHY

The single White runabout entered in the Glidden Tour defeated a dozen high-priced gasoline runabouts competing for this prize.

WON CALIFORNIA RELIABILITY CONTEST

In the original contest held September 20th, two Whites tied with two gasoline cars. In the "run-off" held November 15th and 16th, both Whites made perfect scores while both gasoline cars were penalized.

WON QUAKER CITY ENDURANCE RUN

In this contest, held January 1st, 2d and 5th, the White vanquished 27 gasoline cars of 23 leading makes, winning the MacDonald & Campbell trophy.

FASTEST TIME IN SAN FRANCISCO HILL-CLIMB

Winning the free-for-all, the \$2,500 class and the \$3,500 class.

FASTEST TIME IN THE NEW YORK CARNIVAL HILL-CLIMB

Making the ascent of Fort George hill in 32 1-5 seconds, compared with the best gasoline time of 36 seconds; largest entry list of any hill-climb ever held.

NEW SAN FRANCISCO - LOS ANGELES RECORD

The White car made the 478-mile mountainous journey in 17 hours and 17 minutes, cutting 56 minutes from the previous figures.

DOUBLE VICTORY IN HARRISBURG ENDURANCE RUN

The single White entry was the only touring car to make a perfect score, winning the principal 1908 trophy, the Board of Trade Cup, and also the 1907 prize in a "run-off" with last year's other perfect-score drivers.

PERFECT SCORE IN DETROIT EN- DURANCE RUN

PERFECT SCORE IN BALTIMORE SEALED MECHANISM CONTEST

TWO PERFECT SCORES IN KANSAS CITY RELIABILITY RUN

WRITE FOR LITERATURE

THE WHITE COMPANY

CLEVELAND, OHIO

NEW YORK CITY, Broadway at 62d Street
SAN FRANCISCO, 1460 Market Street
PHILADELPHIA, 629-33 North Broad Street

PITTSBURG, 138-148 Beatty St.

BOSTON, 320 Newbury Street
CHICAGO, 240 Michigan Avenue
CLEVELAND, 407 Rockwell Avenue

MOSS

EVERY MANUFACTURER, JOBBER AND DEALER IN AUTOMOBILES AND ACCESSORIES

knows that good cuts are a necessity for making up advertising matter which will catch the eye and sell goods—the only question is, whom to send their orders to.

If you want an establishment which will handle your work promptly and furnish you cuts that will add 100 per cent. to the selling quality and pulling power of your advertising—that will give the “life,” “snap” and “go” necessary to sell your product, **send us your orders.** We thoroughly understand the wants of the critical buyer.

Operating the oldest and most complete Engraving Plant in America, you receive prompt service, perfect cuts and lowest prices whether you are in Maine, Mexico, Cuba or Alaska.

Engravings of every kind, either in colors or black and white.

TRY US.

MOSS PHOTO-ENGRAVING CO.

295-309 Lafayette Street, Cor. Houston,
“Puck” Building,
NEW YORK



SCHEBLER CARBURETER



Assures the Fullest Joys to Automobiling.

Eliminates every Carbureter trouble—is reliable and dependable under all engine speeds regardless of roads and atmospheric conditions. You can feel sure it will always take you where you want to go and will as certainly bring you back. Supplies a uniform mixture always and increases the power of your engine 20 to 30 per cent. It makes a bad engine good and a good engine better.

Our aim in designing the "SCHEBLER" was greatest efficiency, economy and durability and in these qualities the SCHEBLER EXCELS.

You can afford to experiment with chewing gum, lead pencils and the like, for they won't last long, but when it comes to buying a carbureter you want to know that it is the one best one made, as makeshifts like some of the SCHEBLER imitations will result in continual trouble and annoyance, wear and tear on your motor, and expensive repair bills.

The "SCHEBLER" Carbureter is guaranteed to eliminate all Carbureter troubles—and it does. Let us prove to you on your own car the advantages derived from using the "SCHEBLER" Carbureter in preference to all others.

Write to-day for proofs.

WHEELER & SCHEBLER, Manufacturers, Indianapolis, Ind.

SALES OFFICES,
FACTORY SALES CORPORATION
233-237 Randolph St., Chicago.

NEW ENGLAND OFFICE,
W. J. CONNELL, MANAGER
36 Columbus Ave., Boston, Mass.

EASTERN OFFICE,
E. J. EDMOND, MANAGER
The Motor Mart, 62d and Broadway, N. Y.

CANADIAN OFFICE,
JOHN MILLEN & SONS, Ltd.,
Montreal, Vancouver, Toronto.

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Jas. Baller Co., Portland, Me.	Powell Automobile Co., 2010 Farnam St., Omaha, Neb.	
Angier Co., 9-11 Dorrance St., Providence, R. I.		

THE RUMOR SEASON

is here again, just as it always comes with the regularity of the malaria germ, or the hay-fever, or the June-bug; only it becomes more virulent as it gets older.

The Whooper Company—so Dame Rumor says—will have a world-beater in the shape of a motor that has **MORE CYCLES** to it than you have fingers and toes, to sell at \$——. Just wait and see.

The Spouter Company has something up its sleeve that will be a combination of features as variegated as the ingredients in a mince pie, to sell at \$——. They will show you later.

The Holler Company has a new startler of the wait-till-we-show-you-and-get-left kind. a conglomeration of metals so diversified as to make the most enterprising experimenter in a mixer of metals quit his job in disgust and it will sell at \$——. A lick and a promise.

And so it goes on—if you have been in the business long enough you will know the story.

Not so facetious, but similar in trend, are the reflections as one scans the horizon of trade promises. I have been asked what we are going to do, and when I started to write this ad it was to give the answer:

We have found that with Maxwell principles of automobile construction and with honest manufacture and decent selling methods old terra firma is a good enough place to do business on and we are going to stay on earth, saving ourselves the trouble to come down again after the soaring flights of fancy in which some of our friends now indulge.

We are in the automobile business for the profits that are in it, and we are satisfied with the results. It pays to build the only good moderate priced automobile. Our dealers are satisfied, for they, too, find legitimate effort rewarded with a legitimate profit. Maxwell owners are satisfied, because they know that they possess a car that will give satisfactory service at minimum expense, every day in the year, and that looks as stylish and imposing—without extra charge for the style and imposition—as the highest-priced cars made anywhere. Being built upon well-tried design and honestly made they are free from the find-me-out-later-on handicap of some other manufacturers.

We will sell Maxwell cars, some ten thousand of them, of legitimate prices—prices high enough to give to our dealers and to ourselves a legitimate profit and low enough to give to every purchaser the full value of his money.

The only change we will make will be in the distribution of profits resulting from the sale of Maxwell cars. Here the new arrangement will favor the individual dealer, giving the hustler the hustler's reward. If you are a hustler we want you and you will want us. So let's get together as soon as possible. Write to me now, telling me something of your territory and its sales possibilities, and I will communicate with you and tell you of the new Maxwell selling plan, the plan for business-getters.

Benj. Briscoe
President

MAXWELL-BRISCOE MOTOR CO.

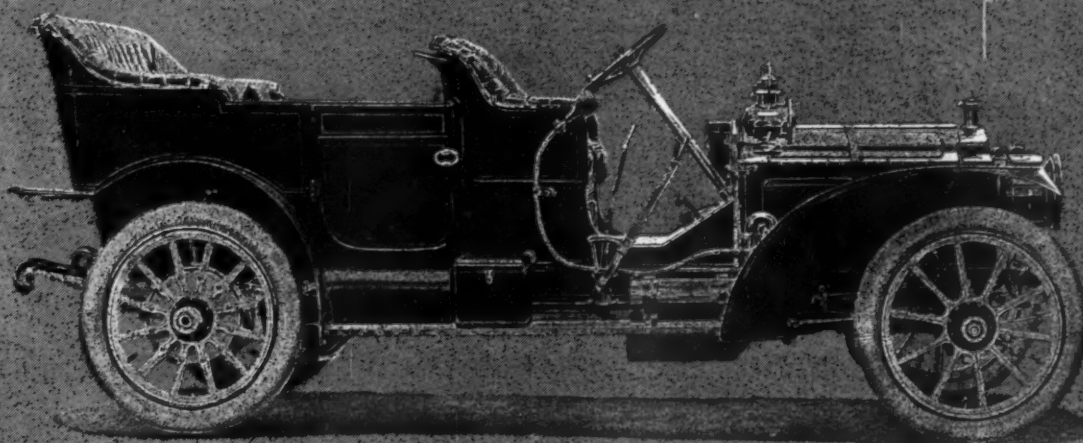
P. O. BOX 103, TARRYTOWN, N. Y.

Members A. M. C. M. A.

Factories: TARRYTOWN, N. Y. NEWCASTLE, IND. PAWTUCKET, R. I.

Packard

"THIRTY"
1909



Touring Car



Packard Motor Car Company
Detroit, Michigan

WINTON

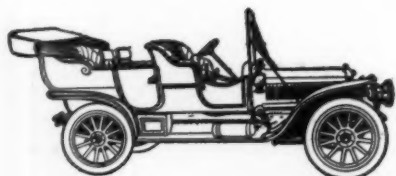


TEN THOUSAND MILES NO REPAIR EXPENSE

¶ I am more than pleased and in every way satisfied with the purchase of my Winton Six-Teen-Six.

¶ It affords me great pleasure to make this statement, and you have my permission to quote me; and what is more, I will consider it a privilege to speak well of Six-Teen-Six cars to any intending purchaser if referred to me.

Statement by Mr. Milton Schnaier, 59 West 76th Street, New York, whose Winton Six-Teen-Six has run more than 10,000 miles without one cent for repairs.



THE WINTON MOTOR CARRIAGE CO.

Member A. L. A. M.

CLEVELAND, OHIO, U. S. A.

Branch Houses in

New York
San Francisco

Chicago
Pittsburg
Baltimore

Philadelphia
Seattle

Boston
Detroit

MAYO RADIATORS

Mayo Radiators perform their functions well under all conditions, and conditions at times are exacting. It is at just such times that Mayo quality asserts itself.



Most of the High Grade Cars built in America use Mayo Radiators as regular equipment
There's a Reason
Send for Catalog Showing 1909 Designs

MAYO RADIATOR COMPANY

New Haven, Conn.



Renault Stock Runabout that broke world's 24-hour record.

RENAULT

"The Car"

WHY is the RENAULT everywhere acknowledged to be the Standard of Automobile Perfection?

BECAUSE the RENAULT excels all other makes of Automobiles in Speed, Endurance and Reliability, which are the three most important requisites of an Automobile.

SPEED. The RENAULT holds the World's Record for 100 miles. On March, 1908, at Ormond, Florida, M. G. Bernin drove a 60 H. P. RENAULT 100 miles in 1 hour, 12 minutes and 56 1-5 seconds, an average of 83 1-2 miles per hour; lowering the previous World's Record by 2 minutes, 54 seconds. Racing Boards have decided that a racing car, to be called a racing car and not "a freak," must run 100 miles at an average speed of at least 60 miles an hour. Therefore the winner of the 100-mile contest earns the Blue Ribbon of Speed.

ENDURANCE. The RENAULT holds the World's Record for 24 hours. On September 6, 1907, at Morris Park, a 35-45 H. P. RENAULT stock car won the 24-hour race, covering 1,070 miles at an average speed of 45 miles per hour; and established a World's Record for a single car in competition on a mile track. The 24-hour race is the most exacting test of the endurance qualities of a car. No severer strain can be put upon a motor than 24-hours' consecutive racing. That is why the 24-hour race is the Blue Ribbon Event of Endurance.

RELIABILITY. The name RENAULT is synonymous of Reliability.

A 1905 RENAULT can still be run from New York to Chicago without a hitch. A RENAULT always keeps its value. A 20-30 H. P. RENAULT, 1905 model, after three years' use, sells for \$3,000. The initial cost of a RENAULT is a little more than that of the high-grade American car, because of the 45 per cent. import duty. But the superiority of workmanship and material are worth more than the difference.

RENAULT cars from 20-30 H.P. up are sold with a guarantee to make the run between New York and Chicago. All RENAULT cars carry a written guarantee for one year.

FURTHERMORE, we guarantee the RENAULT for life against any defect in either workmanship or manufacture. What American car will make that statement?

SILENCE and **SIMPLICITY** are other leading attributes of the RENAULT. Try for yourself and see the difference.

RENAULT FRÈRES SELLING BRANCH

BROADWAY & 57th ST., NEW YORK

PAUL LACROIX, Gen. Mgr.

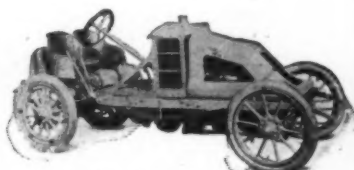
Tel: 3004 Columbus

CHICAGO BRANCH: 1549 Michigan Avenue

SAN FRANCISCO BRANCH: 316-322 Van Ness Avenue

PHILADELPHIA AGENCY: Prescott Adamson, Broad and Spring Garden Streets

BOSTON AGENCY: A. Cutler Morse & Co., Motor Mart, Park Square

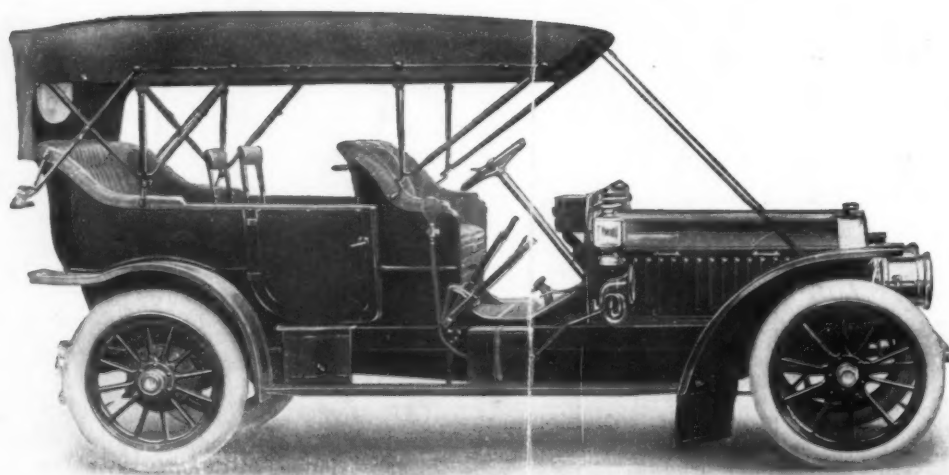


Renault Car that broke world's 100-mile record.

ALL THAT THE
NAME IMPLIES

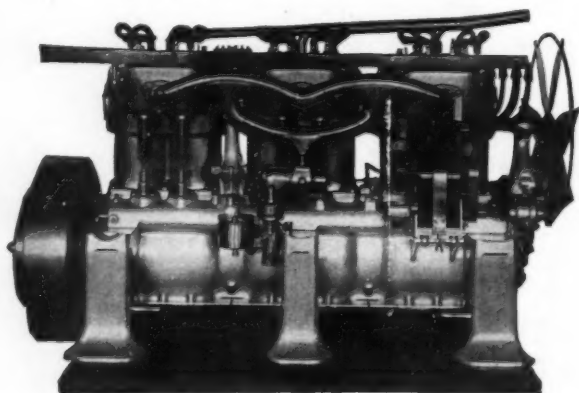
Peerless

LEADS THE
YEAR'S PROGRESS



The Peerless Six Cylinder Car

Peerless values of simplified construction, ease of operation and exquisitely comfortable riding qualities are demonstrated in the construction of the Peerless Model 20.



Peerless Six Cylinder Motor, Intake Side

A ride in the Peerless Six Cylinder Car is a revelation of unsuspected motoring luxury.

With torque practically constant, vibration reduced, and a silent running car, the passengers hardly realize that they are riding in a car propelled by an explosive engine.

They like it best who know it most intimately

A new booklet (D) "Over the Alleghenies in a Six" describes this new model.



THE PEERLESS MOTOR CAR COMPANY

2461 Oakdale Street

Cleveland, Ohio

